

# ED NURSING®

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## Are you undertreating children with community-acquired MRSA?

*Numbers are dramatically increasing in emergency departments*

An infant with pneumonia, a girl with an infected tattoo, and a child with an insect bite. Would you suspect community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) in all these patients? In fact, these are all recent examples of actual MRSA cases seen at Brandon (FL) Regional Hospital's ED.

Nationwide, ED nurses are reporting a disturbing increase in CA-MRSA cases, especially in children. "I have never seen so many MRSA cases in pediatrics as I have the past year," says **Teresa Colletti**, RN, CNM, an ED nurse at Brandon Regional. In the first six months of 2004, the number of MRSA cases seen in the ED was double that of the entire previous year, she notes.

Due to an increase in MRSA cases presenting to the ED at Children's National Medical Center in Washington, DC, an electronic identification process is being developed using the ED's patient tracking system. "The goal is to help identify MRSA patients when they present at the point of entry to the ED," says **Lisa M. Ring**, RN, MSN, CPNP, advanced practice specialist for the Emergency Medicine & Trauma Center at Children's National Medical Center.

According to the Atlanta-based Centers for Disease Control and Prevention (CDC), cases of CA-MRSA are linked to recent antibiotic use, sharing contaminated items, having recurrent skin diseases, and living in crowded settings. The true extent of the problem is not known yet, according to **Marti Smith**, RN, CCRN, an ED nurse at Memorial Medical Center in Modesto, CA. "What is really frightening is the emergence of this bug and its changing susceptibilities,"

### EXECUTIVE SUMMARY

ED nurses are reporting increased numbers of community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) cases, especially in pediatric patients.

- MRSA is being seen even in simple abscesses.
- Abscesses are becoming more common in patients not considered high risk.
- If MRSA cultures come back positive, follow up with the patient to ensure the correct antibiotic is being given.

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she says. "I believe that it's only a matter of time before it becomes more resistant and harder to treat."

To avoid adverse outcomes, ED nurses will need to take quick action and recognize signs and symptoms, says Smith. "If MRSA goes undetected, I would be most worried about undertreatment and insufficient surface disinfection after the patient has been discharged," she adds.

Undertreatment can potentially lead to repeat, and possibly disfiguring, incision and drainage procedures, treatment failure and recurrence of symptoms, and abscess formation in other sites, says Smith. However in rare cases, CA-MRSA can cause severe illness or death, even when treated quickly, such as the cases of four children who died from CA-MRSA.<sup>1</sup>

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To dramatically improve care of pediatric patients with MRSA, take the following steps:

- **Have a high index of suspicion for any type of wound.**

At triage, Smith noticed a disturbing increase in cases of relatively simple abscesses that had gotten worse despite outpatient therapy. "Additionally, I noticed abscesses becoming far more frequent in the less at-risk groups," she says.

Abscesses usually are most common among drug users, homeless patients, and individuals employed in construction or agriculture, explains Smith. "I began seeing young, healthy adults with a spider bite return over and over for worsening abscess and recurrent abscess, at times in distant areas to the previous abscess." Eventually, it was determined that these adults were suffering from CA-MRSA.

- **Don't undertreat MRSA.**

Before cases increased significantly, several cases were not identified as CA-MRSA and therefore were treated ineffectively with cephalexin hydrochloride, which MRSA is not susceptible to, or were overtreated with the potentially toxic antibiotic vancomycin, Smith says.

"Though vancomycin would treat CA-MRSA, it is nephrotoxic and the dosing is very individualized, which requires frequent dosage adjustments," says Smith. It also is administered intravenously, which increases cost, inconvenience, and further infection risk to the patient, she adds.

- **Ensure appropriate follow-up care.**

"We care for MRSA as we would any infection, but when the cultures come back positive, we call the family and inform them as well as change the antibiotic," says Colletti. "We also stress the need for the child to follow up with their pediatrician."

- **Know differences between CA-MRSA and hospital-acquired MRSA.**

The easiest way to distinguish between hospital-acquired MRSA and CA-MRSA is by testing for the susceptibilities, says Smith. "Before CA-MRSA became so well known, most labs only did susceptibilities to vancomycin and a few other antibiotics," she explains.

"Thus, there was no quick way to distinguish between hospital-acquired and community-acquired MRSA."

To address this, the ED has expanded sensitivity testing on cultures for MRSA to include sulfamethoxazole-trimethoprim, clindamycin, ciprofloxacin, and tetracycline, she says. "This helps clinicians differentiate the strains and appropriately treat the patients," says Smith.

Unlike standard hospital-acquired MRSA, CA-MRSA is not resistant to sulfamethoxazole-trimethoprim or tetracycline, and it is almost exclusively causing

## SOURCES/RESOURCE

For more information about caring for patients with community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) in the ED, contact:

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- **Lisa M. Ring**, RN, MSN, CPNP, Advanced Practice Specialist, Emergency Medicine & Trauma Center, Children's National Medical Center, 111 Michigan Ave., N.W., Washington, DC 20010-2970. Telephone: (202) 884-4865. E-mail: Lring @cnmc.org.
- **Marti Smith**, RN, CCRN, Staff Nurse, Emergency Department, Memorial Medical Center, 1700 Coffee Road, Modesto, CA 95355. Telephone: (209) 526-4500. Fax: (209) 571-3342. E-mail: marticcrn@aol.com.

**The Center for Disease Control and Prevention's National Campaign for Appropriate Antibiotic Use** has recommendations to reduce inappropriate antibiotic use and reduce the spread of resistance to antibiotics. For more information, go to [www.cdc.gov/drugresistance/community](http://www.cdc.gov/drugresistance/community).

abscesses and cellulitis, says Smith. It can be cultured out of the noses of asymptomatic persons such as nurses and family members, she says. "Like standard MRSA, it can be treated in asymptomatic individuals with topical mupirocin four times daily to the nares," says Smith.

While there have been a few isolated reports of CA-MRSA fatalities, these seem to be in typically immunocompromised patients such as infants and the elderly, says Smith. "We are not seeing CA-MRSA urine, CA-MRSA sputum, or CA-MRSA sepsis like you do see in the hospital-acquired bug," she adds.

### • Instruct patients in contact precautions.

Insufficient surface disinfection exposes patients, visitors, and staff to contamination, which can cause transmission of infection via contact with nonintact skin or mucous membranes of other individuals, warns Smith.

Smith recommends following current CDC recommendations, which call for patients to follow careful contact precautions. This means no sharing of towels or linens, disinfection of all shared athletic equipment before and after use, showering with an antibacterial soap daily and after athletic or at-risk activities including

construction or agricultural activity, and disinfecting household surfaces that come in contact with non-intact skin and/or mucous membranes.

"I also routinely teach hand hygiene practices with soap and water and alcohol-based hand rubs," says Smith. "I advise patients and family members to wash linens in hot water, to keep wounds covered, and to keep drainage from contaminating the environment."

If the patient is unable to comply with simple precautions because of their age or impairment, place the patient in a private waiting area and post contact precautions outside the door until a room is ready, recommends Smith. "Take the same precautions as you would with a rash or a person who can't cover their mouth when coughing," she says.

After the patient leaves the ED, the housekeeping staff are instructed to clean for contact precautions, says Smith.

### • Ask the right questions at triage.

"At triage, I like to get a feel for how this all got started," says Smith. For example, one 50-year-old executive came in with a knee abscess and reported retiling the bathroom floor, she says. "Without knowing about the recent home tiling, I would more likely suspect a postoperative wound infection, gout, or possible rejection of a cadaveric anterior cruciate ligament transplant. At triage, all of these would present similarly at a quick glance."

Ask patients how they have treated their abscess before coming to the ED, and ask about previous history of abscesses, and if they are experiencing any systemic symptoms such as fever, chills, nausea, vomiting, and cough, advises Smith. "Systemic symptoms would point me away from CA-MRSA, because it rarely causes sepsis or pneumonia," she says.

## Reference

1. Centers for Disease Control and Prevention. Four pediatric deaths from community-acquired methicillin-resistant *Staphylococcus aureus* — Minnesota and North Dakota, 1997-1999. *JAMA* 1999; 282:1,123-1,125. ■

## Do you overlook patients with alcohol problems?

How many patients would you estimate come to your ED for alcohol-related diseases and injuries? According to a new report, the number may be much higher than you think.

There are three times as many alcohol-related ED visits than previous estimates, with an estimated 68.6

## EXECUTIVE SUMMARY

New research shows that alcohol-related ED visits are three times higher than previous estimates. Patients with alcohol problems often are overlooked in EDs.

- Do a brief screening for alcohol abuse whenever possible.
- Arrange referrals for patients who are ready to seek help.
- If patients acknowledge a problem but are not ready to take action, give them a hotline number.

million ED visits attributed to alcohol each year, says a study based on the National Hospital Ambulatory Medical Care Survey's data from 1992-2000.<sup>1</sup>

In addition, numbers of alcohol-related visits are increasing and currently account for almost 8% of all ED visits, says the nine-year study from Massachusetts General Hospital in Boston. "Any nurse who works in the ED, for even one shift, realizes the impact that alcohol has on our society," says **Carlos Camargo**, MD, DRPH, the study's senior author and an ED physician at Massachusetts General. "But it's very hard to detect alcohol-related problems because people deny them and providers don't always ask."

More frequent ED screening can result in more referrals and interventions, and decrease repeat ED visits, argues Camargo. "This is a call to action for EDs," he says.

### ***These patients are low priority***

In the ED, alcohol and substance abuse often is put on the back burner, says **Linda Redd**, RN, BSN, an ED nurse at Massachusetts General. "These patients so easily fall through the cracks," she says. "Once they are medically stabilized, the goal is to keep the flow of patients going."

As a result, these patients keep coming back to the ED, says Redd. "If nobody is able to pick up that piece, then these patients are going to be passed over and will keep coming in time and again," she says.

To significantly improve screening for alcohol problems, consider these suggestions:

- **Make the next step easier for patients.**

Patients who acknowledge an alcohol or substance abuse problem may find that getting help is a daunting challenge, says Redd. "If you leave it up to the patient to find a detox program, chances are they won't be very successful," she says. "In the midst of calling, the patient will often throw their hands up and give up."

Redd facilitates this process by locating beds for both insured and uninsured patients. "By keeping up relationships with the different detox programs, they are more likely to find you a bed when you need it," she says. The ED currently is testing a pilot program by funding two beds for uninsured patients at a local detox center, she reports.

- **Share success stories with ED nurses.**

This is a powerful incentive to screen patients, says Redd.

"I make a point of following up with detox centers about patients we have referred to them," she reports. "For example, I recently learned that one patient who we referred three times finally completed the program."

### ***Another problem may bring them in***

- **Ask all patients about alcohol use.**

Patients may come in with a medical problem completely unrelated to alcohol abuse, emphasizes Redd. "They may not be able to directly ask for help," she says. "The goal is to tap into the whole group of patients that come in for something completely different."

Even if the patient is not yet ready to accept help, you still can offer information, says Redd. "I give patients brochures and a card with a hotline number for them to use when they are ready," she says.

At Boston Medical Center, an innovative Project Assert program screens all noncritical patients presenting for medical treatment in the ED. Even if your ED does not have extensive resources, you still can perform a quick screening by asking the following questions, recommends **Edward Bernstein**, MD, professor and vice chair for academic affairs for the department of emergency medicine at Boston University School of Medicine:

- Do you smoke, drink alcohol or use drugs?

- During a typical week, how many days do you drink alcohol beverages?

- When you drink, how many drinks do you usually consume?

- What is the most you drink in a two-hour period?

"I think these questions could be asked at triage with the understanding that all patients are asked and that we need to know because of alcohol's effects on medication and various health problems," says Bernstein.

Recently, Bernstein screened a 35-year-old woman who came to the ED with a sprained ankle. She reported six drinks on a single occasion, with an additional 160 ounces of beer consumed in the same week. "I reviewed the National Institute on Alcohol Abuse and Alcoholism guidelines with her, which are no more than three drinks for a woman on one occasion, and no more than seven drinks in a week," he says.

## SOURCES/RESOURCE

For more information on alcohol-related visits in the ED, contact:

- **Edward Bernstein, MD**, Professor and Vice Chair for Academic Affairs, Department of Emergency Medicine, Boston University School of Medicine, and Professor of Social and Behavioral Sciences, Boston University School of Public Health, 818 Harrison St., Boston, MA 02118. Telephone: (617) 414-3453. Fax: (617) 414-7759. E-mail: ebernste@bu.edu.
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**The National Institute on Alcohol Abuse and Alcoholism** has developed a guide to assist health care professionals in screening patients for alcohol problems and conducting brief interventions. The guide can be downloaded free of charge on the web site ([www.niaaa.nih.gov](http://www.niaaa.nih.gov)). Click on "Publications," "Reports/Manuals/Guides/Briefs," "Helping Patients with Alcohol Problems: A Health Practitioner's Guide."

At press time, a readiness ruler was scheduled to be posted on the web site "**Emergency Department Alcohol Education Project.**" Web: [www.ed.bmc.org/sbirt](http://www.ed.bmc.org/sbirt).

The woman admitted concern about her drinking and was given a "readiness ruler" that uses a 1-10 scale to assess the patient's readiness to make a change, with "one" being not at all ready and "10" being completely ready. **(For information on how to access a readiness ruler, see resource box, above.)** The woman marked the scale a "10" and said she was willing to go to a specific program that afternoon. "I wrote her plan down on the screening form, which she signed as an agreement with herself to carry out this plan," says Bernstein.

### Reference

1. McDonald AJ, Wang N, Camargo CA. U.S. emergency department visits for alcohol-related diseases and injuries between 1992 and 2000. *Arch Intern Med* 2004; 164:531-537. ■

## Offer intranasal drugs and reduce pain and risks

If you could find a way to ensure that medications were absorbed quicker with less pain and no risk of a needlestick injury, would you do this for your patients? Intranasal drug delivery offers all of these benefits, but the vast majority of EDs don't use it, according to **Timothy Wolfe, MD**, associate professor of emergency medicine at University of Utah School of Medicine in Salt Lake City.

"This is a painless way to give medicine. It is such a simple thing, but many EDs just don't think of it," says **Deborah Critchett, RN**, ED nurse at University of Utah Hospital and Clinics.

Use of intranasal medications will increase dramatically in EDs, especially in light of the nasal flu vaccine and soon-to-be-available nasal insulin, predicts Wolfe. "EDs will recognize how they can reduce patient discomfort, reduce needlestick risk, and speed up care, and will begin using it more and more," he says.

Increasing numbers of medications are becoming available intranasally, such as migraine medications, nasal opiates, and hormones, notes Wolfe. "Transmucosal delivery has a lot of advantages that the pharmaceutical industry can tout. It is much faster than oral delivery and is noninvasive," he adds.

Until recently, medications given intranasally often ran down the patient's throat, but improved technology with inexpensive atomizers now deliver exact doses, Wolfe says.

Here are ways to use intranasal drug delivery in your ED:

- **Pain control.**

Intranasal drug delivery is ideal for rapid onset of

## EXECUTIVE SUMMARY

With intranasal delivery, drugs are absorbed faster than oral delivery and are less painful than intravenous delivery. However, most EDs still do not use this method to administer medications.

- Intranasal drug delivery is ideal for rapid onset of moderate pain control, to relieve the pain of burn dressing changes, and to sedate agitated adults.
- Nasogastric tube placement can be virtually painless with intranasal and oral 4% lidocaine plus oxymetazoline.
- Naloxone given intranasally awakens opiate overdose patients with no risk of needlestick injury.

## Intranasal Delivery for Procedural Sedation

Below are the indications for procedural sedation in the ED, using intranasal delivery of intranasal opiates and benzodiazepines.

### Indications:

- Pediatric procedural sedation (minor procedures).
- Adult and pediatric minor painful procedures: Burn dressing changes; re-packing wounds such as abscesses; anytime you consider an intramuscular shot prior to a procedure.
- Combination therapy may work better than either alone due to variable patient responses to medications.

### Opiates:

Fentanyl or sufentanil are most appropriate for intranasal delivery to treat pain and cause sedation.

- A. Reasonable intranasal starting dose for painful procedures:
  - Fentanyl: 3 mcg/kg (comes in 50 mcg/ml)
  - Sufentanil: 0.2-1.0 mcg/kg (comes in 50 mcg/ml). Use bottle atomizer with pump rather than a syringe with this medication to get exact dose to 0.1 ml.
- B. Be very wary of respiratory depression. Monitor patients with pulse oximetry and close observation whenever using these very powerful opiate medications. Be even more careful when used in combination with midazolam.
- C. Titration to pain is possible. Repeat dosing (½ dose) every 3-5 minutes until desired effect is achieved.

### Benzodiazepines:

Midazolam is most appropriate for intranasal delivery. It results in mild somnolence with resultant reduction in anxiety and probably amnesia. It will not make the patient unconscious. Be aware that midazolam causes some nasal burning for 30-45 seconds when administered.

- Reasonable intranasal starting dose:
  - Midazolam 0.2 to 0.5 mg/kg
  - Use the higher dose if some somnolence preferred.
  - Use the lower dose if opiate is being used and be very wary of respiratory depression when used in combination.
- Use only concentrated midazolam (5 mg/ml).
- Maximum 10 mg (2 ml) (More will just run out nose.)

Source: Timothy Wolfe, MD, Associate Professor, Division of Emergency Medicine, University of Utah School of Medicine, Salt Lake City.

pain control when an intravenous (IV) line won't be started, such as for wound repacking and orthopedic trauma, says Wolfe. "Oral drugs take 40 minutes to achieve reasonable pain control, and intramuscular medications take 20-30 minutes," he explains. "Also, they hurt to administer and present a needlestick risk."

The effect of intranasal fentanyl begins in about five to eight minutes and is titratable, adds Wolfe. "In adults, I give 25 mcg in each nostril, wait one to two minutes, and repeat," he says. "It is painless. It is much preferred over intramuscular injections and is as effective at pain control as IV titration — all without a needlestick."

Recently, Critchett administered fentanyl intranasally for the first time to alleviate a woman's painful hip injury. "She was a hard IV stick because she had a lot of IVs in the past, so we decided to go ahead and gave it intranasally which I had never done before," she adds. "It worked very well, and she

was comfortable within 30 minutes."

Recent research shows that intranasal fentanyl is an effective pain reliever for burn dressing changes, notes Wolfe.<sup>1</sup>

"In the ED, we do a lot of follow-up dressing changes and other painful procedures where a fast-acting, noninvasive, short half-life pain medication would be ideal," he says.

#### • Sedation.

For minor pediatric procedures such as laceration repairs, Wolfe uses intranasal midazolam 0.5 mg/kg. "The downside is that midazolam burns when applied," he notes. "This can be overcome by pretreatment five minutes earlier with intranasal lidocaine." (See chart above with procedural sedation using intranasal delivery of opiates and benzodiazepines.)

#### • Epistaxis.

"This can be a messy procedure," says Wolfe. "Intranasal oxymetazoline plus lidocaine is an easy

## SOURCES

For more information about the use of intranasal drug delivery in the ED, contact:

- **Timothy Wolfe**, MD, Associate Professor, Division of Emergency Medicine, University of Utah School of Medicine, 1150 Moran Building, 75 N. Medical Drive, Salt Lake City, UT 84132. Telephone: (801) 281-3000, ext. 102. E-mail: wolfeman@csolutions.net.

solution. Have the patient blow their nose, spray the meds up the nose, pinch for 10 minutes, and you are usually done. If not, they are numb, and you can cauterize them.”

### ***Makes this procedure ‘a piece of cake’***

- **Nasogastric tube placement.**

Intranasal and oral 4% lidocaine plus oxymetazoline eliminates pain for nasogastric tube placement in most patients, says Wolfe. “This makes this painful procedure a piece of cake,” he says. “It works great for fiberoptic procedures as well.”

Spray the medication in both nostrils, recommends Critchett. “This way, in case it doesn’t go down one side, then the other one is numbed,” she says. “Patients do seem more comfortable with the procedure.”

- **Agitation.**

Many emergency medical services agencies now use intranasal midazolam to sedate adults with psychiatric or drug-induced agitation, reports Wolfe. “Most use 5 mg per nostril and are anecdotally reporting good efficacy with no needlestick risk,” he adds.

- **Opiate overdose.**

Intranasal naloxone awakens the vast majority of opiate overdoses without the risk of a needlestick from a heroin user, says Wolfe.

- **Seizures.**

Intranasal midazolam works as well as IV diazepam and better than rectal diazepam to treat seizures in children, and it is effective in adults as well, according to Wolfe. “You can treat most seizures with intranasal therapy before you can even start an IV,” he says.

### **Reference**

1. Finn J, Wright J, et al. A randomized crossover trial of patient-controlled intranasal fentanyl and oral morphine for procedural wound care in adult patients with burns. *Burns* 2004; 30:262-268. ■

## Stop life-threatening heparin dosage errors

*(Editor’s note: This is the second in a two-part series on high-alert medications in the ED. This month, we address how to avoid dosage errors involving heparin. Last month, we gave practice changes to avoid errors with high-alert drugs.)*

**D**o you worry about miscalculating a heparin dosage, misprogramming an infusion pump, or forgetting to inform the admitting nurse that a patient already has received heparin in the ED?

These are all common contributing factors to heparin errors, according to the annual data summary report for 2002 from MedMARx, the medication error reporting program operated by the Rockville, MD-based United States Pharmacopeia (USP).

Heparin was the drug involved most often in 14,800 medication errors occurring in EDs from 1999 through 2003. “Of 785 heparin errors, 44 patients were harmed, some permanently,” reports **Rodney W. Hicks**, MSN, RN, ARNP, research coordinator for the USP’s Center for the Advancement of Patient Safety.<sup>1</sup>

To avoid heparin errors in your ED, you must take the following steps:

- **Use preprinted sheets.**

Incorrect dosing is the most common type of heparin error, due to multiple math calculations that are necessary, according to Hicks. He recommends using preprinted order sheets with calculations already done based on the patient’s weight. “This is a very safe way to calculate the initial dose,” he says.

At Palomar Pomerado Health System in San Diego, a preprinted physician order form was created with input from the pharmacy, nursing, and medical staff to

## EXECUTIVE SUMMARY

Heparin was the most common drug involved in medication errors occurring in EDs from 1999 through 2003. Incorrect dosages, misprogramming of infusion pumps, and inaccurate patient weights were contributing factors.

- Perform independent double-checks when calculating doses and setting infusion pumps rates.
- Use preprinted order forms with weight-based dosages already calculated.
- When giving report, clearly communicate the heparin doses that have been administered in the ED.

## SOURCES/RESOURCES

For more information on preventing heparin errors, contact:

- **Judy E. Davidson**, RN, MS, CCRN, FCCM, Clinical Nurse Specialist, Palomar Pomerado Health System, 15615 Pomerado Road, Poway, CA 92064. Telephone: (858) 613-4159. E-mail: Judy.Davidson@pph.org.
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- **Susan F. Paparella**, RN, MSN, Director of Consulting Services, Institute for Safe Medication Practices, 1800 Byberry Road, Suite 810, Huntingdon Valley, PA 19006. Telephone: (215) 947-7797. Fax: (215) 914-1492. E-Mail: spaparella@ismp.org.

**Summary of Information Submitted to MedMARx in the Year 2002: The Quest for Quality** analyzes 192,477 medication errors that were voluntarily reported by 500 hospitals and health systems. The cost is \$79. To order, contact: U.S. Pharmacopeia, Customer Service, 12601 Twinbrook Parkway, Rockville, MD 20852-1790. Telephone: (800) 227-8772 or (301) 881-0666. Fax: (301) 816-8148. E-mail: custsvc@usp.org. A poster presentation of errors occurring in the ED can be accessed free of charge at the USP web site ([www.usp.org](http://www.usp.org).) Click on "Patient Safety," "Patient Safety Presentations," "Posters," "Medication Errors in Emergency Department Settings," and "Click here to view the poster."

**The Medley Medication Safety System** allows hospitals to enter various drug infusion protocols into a drug library with pre-defined dose limits. For more information, contact Alaris Medical Systems, 10221 Wateridge Circle, San Diego, CA 92121-2772. Telephone: (800) 854-7128 or (858) 458-7000. Fax: (858) 458-7760. E-mail: internet\_ebusiness@alarismed.com.

**Medication infusion pump software** is available on all Colleague CX infusion pump models manufactured by Baxter Healthcare Corp. The Colleague Guardian Feature software allows hospitals to set customized dose limits for more than 90 drug protocols. For more information, contact: Baxter Healthcare Corp., One Baxter Parkway, Deerfield, IL 60015-4625. Phone: (800) 422-9837 or (847) 948-4770. Fax: (847) 948-3642.

take the guesswork out of heparin dosing. "It has the dosing clearly spelled out for each indication," says **Judy E. Davidson**, RN, MS, CCRN, FCCM, clinical nurse specialist. "There is a chart on the back where the dose can be looked up for each kilogram weight."

Use commercially available pre-mixed heparin products as much as possible, advises **Susan F. Paparella**, RN, MSN, director of consulting services for Huntingdon Valley, PA-based Institute for Safe Medication Practices. "This is very important: Nurses should not be mixing their own heparin drips," she says.

### • **Don't store different strengths of heparin together.**

If you use an automated dispensing cabinet, you should not store differing strengths of heparin, such as 500 and 5,000 units, in the same drawer, advises Hicks. "That's called 'the neighborhood effect,'" he says. "Different strengths of the same product should be in physically different drawers to minimize the chance of taking the wrong amount."

### • **Clearly document heparin given in the ED.**

If the admitting nurse is not aware that a patient was given heparin in the ED, duplicate doses may be given, says Paparella. "This has happened a lot with heparin products and has resulted in patient deaths," she reports. "The problem may be increasing because patients are being held in the ED for hours awaiting an inpatient bed."

By faxing a list of medications given in the ED to pharmacy, this essential information will be available when the admission medications get entered, advises Paparella. "Some EDs without 24-hour pharmacy support are applying a bold auxiliary label to the patient's chart stating 'Patient has received heparin,'" she adds.

Clearly communicate all medications administered in the ED when giving report to the admitting nurse, Paparella underscores.

In the ED, if a nurse doesn't document that a heparin product was given, another nurse may pick up the patient's chart and give a duplicate dose, says Hicks. "This often occurs at shift change," he says. To prevent this, Hicks suggests using a standardized flow sheet that clearly documents when and how much heparin was administered.

### • **Always perform an independent double-check.**

Do an independent double-check for all high-alert medications, including heparin, advises Hicks. "Double-checked does not mean confirming another nurse's calculation," he says. "You need to work independently and see if you arrive at the same answer."

After several heparin errors occurred at Palomar Pomerado Health System, a new procedure requires two ED nurses to calculate the first bolus dose and rate of infusion independently, reports Davidson. "Both of their signatures must be entered on the heparin order

sheet along with the math,” she says. “We haven’t had an error related to calculation since.”

- **Ensure that infusion pumps are programmed correctly.**

One serious heparin error involved nurses misprogramming the pump to give the continuous infusion, says Hicks. “They primed the pump at 900 mL an hour to load the pump and never turned it down to the 10 mL for maintenance. So in one hour, the patient got a 900-fold overdose,” he says.

This resulted in overcoagulation, which was corrected by discontinuing the infusion. The patient survived but had to undergo additional tests as a result of the error. To prevent this, Hicks recommends using “smart pumps” with pre-defined dose limits. (See resource listing on p. 104 for more information on smart pumps.)

- **Make sure the patient’s weight is correct.**

“We saw multiple errors that resulted because the

patient’s weight was incorrect,” says Hicks. He recommends documenting the patient’s weight in pounds and kilograms at triage. “With electronic scales, you can change the display from pounds to kilograms with the touch of a button,” he says. “That’s one extra second documentation burden for the nurse, but that one second buys you safety.”

Otherwise, if the number “140” is on the chart, it could mean pounds or kilograms, Hicks explains. “Otherwise, use an Excel spreadsheet to print out a laminated card with weight conversion,” he suggests. “That’s a simple \$1.98 fix.”

## Reference

1. Hicks RW, Cousins DD, Williams RL. *Summary of Information Submitted to MedMARx in the Year 2002: The Quest for Quality*. Rockville, MD: USP Center for the Advancement of Patient Safety; 2003. ■

## Don’t forget children’s needs in your disaster plan

If an unconscious man was rushed to your ED after a terrorist attack with possible exposure to biological or chemical agents, would you know exactly how to decontaminate and treat this patient? What if your patient was a 3-year-old?

Pediatric patients have special needs during disasters, emphasizes **Anne Jacob**, MD, a consultant in emergency management for Alachua County Fire & Rescue, based in Gainesville, FL, and former ED attending physician at the University of Florida. “It’s one of those things that seems simple, but there is a lot to it,” she says. “Kids have increased needs and are very susceptible to injury.”

To dramatically improve care of children during a disaster, consider these suggestions:

### EXECUTIVE SUMMARY

Pediatric patients have unique needs during disasters, and they are more susceptible than adults to nuclear, biological, and chemical agents.

- Include pediatric-specific information in your disaster plan.
- Keep family members together when possible.
- Take photos of unaccompanied children to speed identification.

- **Understand anatomical and physiological differences.**

A child’s physiological response from exposure to nuclear, biological, and chemical agents is much different from an adult’s, says **Lisa Kosits**, RN, MSN, CCRN, CEN, clinical inservice instructor for the ED at Montefiore Medical Center in The Bronx, NY.

Children are closer to the ground and have higher metabolic rates, increased relative minute ventilation, thinner and more pliable skin, increased body surface area to mass ratio, immature immune systems, and a more permeable blood-brain barrier, she says. “All of this results in increased absorption and distribution,” says Kosits.

For that reason, time is an even bigger factor in treatment than it is with adults, she says. “Many chemical agents have a rapid onset, which is accelerated by these anatomical and physiological differences.”

The upside is that children are very resilient, says Jacob. “An acutely injured child can bounce back with less intervention than an adult,” she says. “Sometimes just a little oxygen and fluid resuscitation can turn things around.”

- **Be aware of current recommendations for drug dosing in children.**

AtroPen, an atropine autoinjector manufactured by Columbia, MD-based Meridian Medical Technologies, was approved by the Food and Drug Administration in late 2003 as a replacement for atropine. However, the product is not approved for use in children weighing less than 15 lbs. “It is not a replacement nor a substitute for the Mark I Nerve Agent Antidote Kit [also manufactured by Meridian Medical Technologies], which contains pralidoxime and atropine used to treat

## SOURCES

For more information on caring for children during a disaster, contact:

- **Anne Jacob**, MD, Community Response Consulting, 4300 N.W. 23rd Ave., Suite 483, Gainesville, FL 32606. E-mail: [ajacob@cris.org](mailto:ajacob@cris.org).
- **Lisa Kosits**, RN, Clinical Inservice Instructor, Division of Education and Organizational Development, Montefiore Medical Center, 111 E. 210th St., Bronx, NY 10467. Telephone: (718) 920-5241. Fax: (718) 324-4246. E-mail: [lkosits@montefiore.org](mailto:lkosits@montefiore.org).

**“Pediatric Disaster Life Support: Caring for Children During Disasters”** is a two-day training course for medical, emergency medical services, and disaster professionals. For training dates, contact the University of Massachusetts Medical School, Continuing Education Office, 55 Lake Ave., Worcester, MA 01655. Telephone: (508) 856-4101. E-mail: [carol.shustak@umassmed.edu](mailto:carol.shustak@umassmed.edu).

**A pamphlet describing symptoms of traumatic stress** and strategies to help children cope in disaster situations can be downloaded at no charge on the Emergency Medical Services for Children (EMS-C) web site ([www.ems-c.org](http://www.ems-c.org)). Click on “Products & Resources.” Under “Issues of Interest,” click on “Disasters,” “When Disaster Strikes: Helping Young Children Cope.” Guidelines for pediatric equipment in the ED also can be accessed at no charge by clicking on “Products & Resources,” “EMSC Pediatric Emergency Care Resource Kit,” “Equipment Guidelines,” and “Guidelines for Pediatric Equipment and Supplies for Emergency Departments.”

nerve agent exposure,” notes Kosits, adding that the recommendations for the Mark I kit are ages 3 and older.

“However, the benefits would clearly be outweighed by the risks in a bona-fide exposure to a nerve agent, and these drugs should be seriously considered if no other treatment is available,” says Kosits.

• **Include pediatric-specific information during disaster planning.**

At Montefiore, information on pediatric patients is included in the Weapons of Mass Destruction training program that all ED staff members are mandated to attend. “We also have pediatric clinical resource

material available to the staff on our ED web page and in a resource manual on emergency preparedness,” says Kosits.

• **Keep the family together.**

Although the facility has adult and pediatric EDs, an effort would be made to share resources during a disaster, says Kosits. “The goal is for the family to stay together and be treated in the same ED,” she says.

• **Watch what you say.**

Children will take your cue in how they respond to a disaster, says Jacob. “Kids pick up on our tone of voice and how frightened we are,” she says. “Never make statements that indicate hopelessness or lack of caring, or say things like, ‘The parents are probably dead.’”

• **Take photos of children.**

Since children don’t carry identification and may be nonverbal, taking photos can help you identify them and locate family members, suggests Jacob. “During a disaster, frantic parents are looking for their child,” she says. With a digital camera, you could have a web site set up within an hour and post pictures of all the unidentified children at your ED, she explains.

• **Participate in community-based disaster planning.**

Team with local school administrators to prepare for incidents involving large numbers of children, recommends Jacob. “School-based incidents, such as a bus crash or school shooting, generate both seriously injured children and an even greater number of worried well and their parents,” she says.

Designate a site, such as an unaffected school gymnasium, as a safe location for parents to be reunited with their uninjured children, suggests Jacob. “Teaming has the added benefit of promoting compliance with 2004 Joint Commission requirements for hospital involvement in community disaster plans, as well as lessening the crowds at the ED.”

• **Have age-appropriate equipment.**

Check your ED’s equipment against the Emergency Medical Services for Children (EMS-C) recommendations for pediatric supplies, recommends Jacob. “A lot of the supplies on that list are items you would use for a mass-casualty incident,” she says. **(To order the complete guidelines, see resource box, above left. For more information on this topic, see “New guidelines warn: You may not be prepared to take care of sick children,” *ED Nursing*, June 2001, p. 101.)**

In addition, you should have age-appropriate toys on hand, says Jacob. “After disasters, there are often periods of time where people are sitting around waiting,” she says. “Even something simple like crayons and paper can occupy and distract a child.” ■

## COST-SAVING TIP



### Save \$300 a month with disposable meal trays

Are dirty meal trays a common sight in your ED? By switching to a disposable tray system, the ED at Paradise Valley Hospital in National City, CA, was able to save \$300 a month, reports **Stephanie J. Baker**, RN, BSN, CEN, MBA/HCM, director of emergency services.

“We had a real problem in the ED with the piling up of dirty food trays,” she says. “We would order meals for patients, feed them, but then constantly had to call dietary to come back and pick up dirty trays that we had piled up in our utility room.”

Since the ED wasn't on a regular food tray delivery schedule, dietary staff weren't coming back and picking them up routinely. “Often I would go in and find five to 10 dirty trays,” says Baker.

Baker worked with the director of dietary to switch to a disposable tray system for the ED, with patient meals served on sturdy styrofoam trays with plastic plates and covers to keep food warm, along with plastic utensils, cups, and paper napkins. “This gets rid of the infection control issues and is much safer for our psychiatric patients who were not to have metal eating utensils anyway,” says Baker.

The ED staff throw the entire tray in the trash when the patient is finished, which saves the dietary staff from returning multiple times every day to pick up dirty trays. In addition, dietary was asked to routinely deliver six lunches with a sandwich, fruit, and milk at 6 p.m. as a quick way to feed patients during the night shift. “This prevented the night house supervisor from having to go to the cafeteria after hours to scrounge up food for us and allowed us to feed hypoglycemic or diabetic patients quickly,” says Baker.

In addition, admitted patients may need meals while waiting for an inpatient bed to become available, says Baker. “We also often feed psychiatric patients, as many times they have been decompensating prior to their visit and have not eaten properly for a day or two,” she says. “It also keeps them calm and gives them something to do while we get them ready for admission.”

Baker estimates that the new system saves an hour a day for ED technicians, since multiple phone calls and trips to collect and return trays are saved. “At an hourly rate of about \$10 for ED techs, this saves us about \$300 per month from the ED budget,” reports Baker.

*[Editor's note: Baker can be reached at Paradise Valley Hospital, 2400 E. Fourth St., National City, CA 91950. Telephone: (619) 470-4386. E-mail: StephanieRNI@cox.net.]* ■

### Difficult-start IVs can be tackled with Penrose drains

Many of the tourniquets that come in prepackaged intravenous (IV) start kits are not adequate for “difficult-start” patients, says **Linell Jones**, RN, BSN, CEN, ED nurse at Good Samaritan Hospital in Puyallup, WA.

“In obese patients, they tend to roll into a very uncomfortable, thin band much like placing a rubber band on the arm,” she explains. “In other patients, they stretch too much and don't compress enough to distend the vein.”

Although there are many manufacturers, the tourniquets are all the same size, says Jones.

A relatively small percentage of patients are difficult starts, but they tend to be the sickest and need the IV the most, explains Jones. “There may be additional sticks or searching for the vein that occurs, which is painful,” she adds.

One-inch Penrose drains can be used the same way as regular tourniquets, suggests Jones. “They are wider and since they are thicker with two layers, they don't roll into a thin band as easily,” she says. “I wash mine afterward with regular soap, rub with our alcohol-based hand sanitizer, and re-powder with baby powder.”

In addition, blood pressure cuffs can be used, by placing them in the same location you would place the tourniquet, with the tubing at the top, going away from the venipuncture site, adds Jones. “The cuff is then inflated to a pressure above diastolic but below systolic.”

*[Editor's note: For more information, contact Linell Jones, RN, BSN, CEN, Staff Nurse, Emergency Department, Good Samaritan Hospital, 407 14th Ave., S.E., Puyallup, WA 98371. Telephone: (253) 697-4200. E-mail: linelljones@goodsamhealth.org.]* ■

## COMING IN FUTURE MONTHS

■ Dramatically reduce risks of chemical, physical restraints

■ Needlestick prevention update — what you must know

■ How to use the Internet to recruit successfully

■ New approaches that work for adults with seizures

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## CE instructions

Nurses participate in this continuing education program by reading the issue, using the provided references for further research, and studying the questions at the end of the issue.

Participants should select what they believe to be the correct answers, then refer to the list of correct answers to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material.

After completing this semester's activity with the **December** issue, you must complete the evaluation form provided in that issue and return it in the reply envelope provided in order to receive a certificate of completion. When your evaluation is received, a certificate will be mailed to you. ■

## CE questions

After reading this issue of *ED Nursing*, the CE participant should be able to:

- **Identify** clinical, regulatory, or social issues relating to ED nursing (See *Are you undertreating children with community-acquired MRSA?* and *Stop life-threatening heparin dosage errors* in this issue.)
- **Describe** how those issues affect nursing service delivery. (See *Offer intranasal drugs and reduce pain and risks.*)
- **Cite** practical solutions to problems and integrate information into the ED nurse's daily practices, according to advice from nationally recognized experts. (See *Do you overlook patients with alcohol problems?*)

1. Which of the following is true of CA-MRSA cases, according to Marti Smith, RN, CCRN?
  - A. CA-MRSA is seen only in at-risk groups.
  - B. CA-MRSA is increasingly being seen in pediatric ED patients.
  - C. CA-MRSA should be treated with cephalexin hydrochloride.
  - D. CA-MRSA should be treated with vancomycin.
2. Which is recommended for screening of alcohol abuse in the ED, according to Linda Redd, an ED nurse at Massachusetts General?
  - A. Patients should not be screened unless they present with an obvious problem.
  - B. More frequent screening would improve patient care and reduce repeat ED visits.
  - C. Give patients referrals even if they are unwilling to accept immediate help.
  - D. Avoid arranging follow-up care for patients.
3. Which is true regarding intranasal drug delivery, according to Timothy Wolfe, MD?
  - A. Drugs are absorbed faster than with oral delivery.
  - B. Intranasal delivery is more painful than intravenous delivery.
  - C. Pain medications cannot be effectively administered intranasally.
  - D. Intranasal drugs should not be used in pediatric patients.
4. Which is an effective way to prevent heparin errors in the ED, according to Susan F. Paparella, RN, MSN?
  - A. Have nurses calculate all heparin drips.
  - B. Store different strengths of heparin in the same drawer.
  - C. Document the patient's weight in pounds, not kilograms.
  - D. Inform admitting nurse of all heparin products given in the ED.

**Answers: 1. B; 2. B; 3. A; 4. D.**