AMERICAN HEALTH CONSULTANTS®

ED NURSING™

Bioterrorism Watch enclosed in this issue

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January 2002

Emergency department nurses may be first to notice a smallpox outbreak

Do you know what to do with your suspicions? Here are exact steps to take

It's the moment of truth: A woman comes to the ED with fever and body aches. Suddenly, you notice a distinctive rash on her face and arms. The patient reports having had chicken pox as a child.

The steps you take next will have a dramatic impact on your community, your colleagues, and your own health.

"I am sure the first case of smallpox will cause major panic," says **Sue C. Felt**, RN, MS, MPH, CIC, associate hospital epidemiologist and infection control coordinator at San Francisco General Hospital.

At the end of 2001, EDs nationwide reported scores of patients who presented claiming anthrax exposure.

Darlene Matsuoka, RN, BSN, CEN, CCRN, ED clinical nurse educator at Harborview Medical Center in Seattle, says, "The worried well have not come to EDs fearing smallpox because it has not yet been identified as a true, credible threat."

However, you should be prepared for this to occur, says Felt. "It probably will happen with all the hype on TV," she predicts.

EXECUTIVE SUMMARY

You should have a high index of suspicion for smallpox, and the major red flag to watch for is a patient with flulike symptoms, a rash, and altered mentation.

- A chickenpox rash starts on the trunk with lesions in different stages, and a smallpox rash starts on the face with lesions all having the same appearance.
- Immediately isolate the patient in a negative-pressure room.
- There is no need for ED personnel to be vaccinated against smallpox, and if you are exposed, you have up to four days to receive the vaccine.

If a patient fears smallpox exposure, but there is no clinical evidence to support this, Felt advises assuring patients that there is no reason to believe that they have been exposed and that their symptoms are not consistent with smallpox. **(See Fact Sheet on Smallpox, p. 31.)**

"The clinical presentation of a sick patient with flu, rash, and altered mentation would be the red flag."

Here are specific interventions to take if you suspect smallpox:

• Determine if the patient actually has chickenpox.

You may think that chickenpox is easily confused with smallpox, but there are distinct differences in presentation, according to **Maureen Titus**, RN, CIC, director of infection control at Carolinas Medical Center in Charlotte, NC. **(See chart for distinguishing between smallpox and chickenpox, p. 32.)**

"The smallpox patient has a rash with maculopapular lesions starting on the face and spreading to the truck, legs, palms, and soles," she notes. "The rash progresses uniformly, and all lesions have the same appearance."

In contrast, the chickenpox rash starts on the trunk and then spreads to the face, and the lesions are in different stages at the same time on the same area of skin, Titus explains.

A smallpox patient probably would present with a two-day history of fever, malaise, body aches, and also a rash, says Felt.

Smallpox rash has fewer lesions on the trunk than the distal extremities and face, she says.

• Look for clues when assessing patient.

Matsuoka points to the following epidemiological "clues" pointing to a possible smallpox outbreak:

— a large epidemic with high illness and death rate;
— a predomination of respiratory symptoms;
— sick or dead animals of multiple types.

Immunosuppressed and HIV-positive individuals likely would present with the first cases of smallpox, says Matsuoka. "Like the canaries in the coal mines that were there to detect the presence of gases, these patients are most vulnerable," she says.

SOURCES

For more information on smallpox, contact:

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- **Maureen Titus**, RN, CIC, Director, Infection Control, Carolinas Medical Center, P.O. Box 32861, Charlotte, NC 28232. Telephone: (704) 355-2327. Fax: (704) 355-7696. E-mail: Maureen.Titus@carolinashealthcare.org.

Consider the following information when assessing a patient for smallpox exposure: infectious contacts, employment history, and activities during the proceeding three to five days.

If working up a suspected case, you also should ask about the patient's travel history, says Matsuoka. "Certainly the department of health would follow up on all contacts, but a preliminary screening of trips would identify the possibility of spread," she adds.

Matsuoka advises having a higher level of suspicion for anyone presenting with flulike symptoms, rash, changes in mentation, or hemorrhagic signs such as bloody conjunctiva, bruising, or bloody stools. However, Matsuoka cautions that these should only be considerations and should not heighten paranoia.

"The clinical presentation of a sick patient with flu, rash, and altered mentation would be the red flag," she says.

• Isolate the patient immediately.

Smallpox's primary route is inhalation, and it is highly contagious, says Matsuoka. "There is a 20%-40% mortality rate in unvaccinated victims," she adds. "All contacts are quarantined for at least 17 days. It is

COMING IN FUTURE MONTHS

- Update on syphilis screening of pregnant women
- Improve care of children: Collaborate with school nurses
- How to comply with recommendations for emergency contraception
- Ways to prevent falls in elderly patients

Fact Sheet on Smallpox

Clinical Features:

Incubation: 7-17 days

Natural History

- Febrile 2-4 days with fever, rigors, malaise, headache, backache, and vomiting (Occasionally delirium, transient early rash)
- Acute papular dermatitis on face, hands, forearms, spreading to lower extremities and trunk
- Synchronous progression: papule→vesicle→pustule
- Scabs over on days 8-14 after onset of fever
- Scabs slough off 14-28 days after fever onset

Expected Delivery Method(s)

- Infected persons entering and mingling with local residents. This would be difficult to execute, as the period of maximum viral shedding is after the patient becomes obviously ill.
- Aerosol release
  - Point source
  - Line source
  - Both of these would be difficult, as the agent has not been successfully weaponized in the West.

Precautions

Decontamination:

- Patients and clothing are highly contagious.
- Clothing and linen must be sterilized in an autoclave or by boiling.
- Hard surfaces can be cleaned with quartenary ammonium, phenolic, or 5% bleach solutions. Allow contact for at least four hours.

Contagious?

- Patients, linens, and everything else the patient touched are highly contagious, as is the area in which droplets from the patient may have landed.

Isolation:

- Strict isolation is required. This requires a combination of:
  - Contact isolation
  - Droplet precautions
  - Universal precautions
- Cohorting of patients is encouraged.
- Contacts need to be immunized and quarantined for 17 days.
- Home quarantine also is an option, but will require supports (such as food deliveries) to allow people to remain at home for the duration.

Prophylaxis:

- Immunization is usually protective if done within 24 hours of exposure.

Treatment

- First, do everything possible to limit spread.
- Use primarily supportive care.
- There is a Smallpox Immune Globulin, but its supply is limited, as is its efficacy.
- Cidofovir may be effective.

Source: Charles Werntz, MD, Department of Community Medicine, West Virginia University, Morgantown, and Janet Williams, MD, West Virginia University Center for Rural Emergency Medicine, Morgantown.

infectious until all scabs are healed over."

If smallpox is suspected, the patient should immediately be placed on airborne National Institute of Occupational Safety and Health respiratory required precautions and contact precautions, says Titus. "If the patient is at a triage desk or in a common waiting area, he or she should be given a mask to wear and taken to a private room with the door closed immediately," she says.

Next, quickly put the patient in a negative pressure room with high-efficiency particulate air (HEPA) filtration or direct exhaust to the outside, says Titus.

Anyone who enters the room must wear a N95 respirator, gown, and gloves, she says. "Dedicated patient equipment also should be placed in the room," adds Titus.

Felt notes that although large hospitals usually have good respiratory isolation rooms, many public and smaller EDs may not. "If that is the case in your facility, you might look into purchasing portable isolation units that provide negative pressure," she suggests.

• Document appropriate information.

You must document in the patient's file, "Highly infectious disease. Strict respiratory and contact isolation," says Felt.

Signs and symptoms of the illness should be documented, along with the time the patient was placed in precautions and who has been notified of the suspicion for smallpox, says Titus. "Also, a list of household and other close contacts should be generated and documented," she adds.

• Contact the appropriate individuals.

As soon as you suspect smallpox, contact your hospital epidemiologist and infection control practitioner, says Titus. "They in turn will contact the local and state health departments and the Centers for Disease Control and Prevention [CDC]," she says. **(See**

Continued on page 33

Distinguishing Smallpox from Chickenpox

Carolinas Medical Center

Characteristic	Smallpox	Chickenpox
Mode of Transmission	Airborne droplets plus contact with lesions	Airborne droplets plus contact with lesions
Incubation Period	Average = 12-14 days (range is from 7-17 days)	Average = 14-16 days (range is from 10-21 days; prophylactic acyclovir and varicella zoster immune globulin extend incubation period to 28 days)
Prodrome Symptoms	• High fever, malaise, prostration, headache, and myalgias in the 48-hour period before rash develops • Vomiting is 50%	• Fever, malaise, and pharyngitis in the 24-48 hour period before rash occurs
Rash/Diagnostic Characteristics	• Rash begins as maculopapular lesions on face and oral mucosa • Spreads centrifugally to trunk and legs • Becomes vesicular within two days • Does NOT usually have surrounding erythema • Becomes pustular over next 2-3 days • May occur on palms and soles • Rash progresses uniformly -- all lesions have the same appearance • Lesions occur deep in dermis -- lesions feel "thick" or indurated • More pain than pruritis • Crusts begin to form on day eight or nine of rash • Scabs fall off by days 14-21; residual scar common	• Rash begins as pruritic papules on trunk • Centripetal rash -- more concentrated on trunk, then spreads to face/scalp followed by upper arms and thighs • May be present on oral mucosa • Becomes vesicular with surrounding erythema ("dew drop on rose petal") • Lesions are superficial • New crops of lesions appear over 2-4 days -- lesions at various stages can be seen at the same time on the same area of skin • Almost NEVER on palms and soles • Most lesions have crusted by rash day seven
Period of Infectivity	• NOT infectious until rash develops • Infectious until all lesions have scabbed over • About 60% of unvaccinated household contacts become infected	• Most infectious in the 48-hour period before rash develops • Infectious until all lesions have scabbed over • About 90% of unvaccinated household contacts become infected
Isolation Category	• Airborne-National Institute of Occupational Safety and Health Respiratory Required Precautions plus Contact Precautions	• Airborne plus Contact Precautions • Negative pressure room with high efficiency particulate air filtration or direct exhaust

Source: Roger D. Lovell, MD, Infectious Diseases and Hospital Epidemiologist, Carolinas Medical Center, Charlotte, NC.

excerpt of CDC guidelines for smallpox, inserted in this issue.)

Law enforcement also will get involved, says Felt. "*One* case is an epidemic and most certainly a bioterrorist event," she says.

Only state public health departments can activate the systems necessary to receive specimens and provide vaccine through CDC, says Felt. "Assume you will get smallpox, and even if you receive vaccine, you might want to be isolated for 15-17 days," she adds.

Remind public health and infection control to notify the laboratory, says Felt. "Chickenpox can be ruled out fairly quickly if the patient already has chickenpox history or a varicella immunity. PCR [polymerase chain reaction] of DNA would provide certainty," she says. "You would want to get the patient on an antiviral such as cidofovir as soon as possible."

• If exposed, take necessary measures.

Treatment is supportive, and a CDC vaccine and immune globulin is available, says Matsuoka. "No antiviral medication is available. Vaccination is the best means of preventing infection," she says. **(See story on use of positive-air pressure respirators, below.)**

However, there is *not* a need for ED personnel to be vaccinated against smallpox, she stresses. If there is an exposure, there is emergency vaccine available and you have up to four days to receive it, says Matsuoka.

"While there is a 30% mortality with smallpox in the unvaccinated, I agree with the CDC's position to deploy the stockpile of smallpox vaccine only when necessary," she adds. "This is a 'surveillance-and-containment' strategy."

No vaccine is free of side effects, notes Matsuoka. "Besides allergic reactions, there is the small risk of cerebral edema and death," she says. ■

Do you know how to use PAPRs?

You should use a positive-air pressure respirator (PAPR) to protect against bacteria and viruses up to 0.3 microns in length if you suspect a patient has smallpox, recommends **Darlene Matsuoka**, RN, BSN, CEN, CCRN, ED clinical nurse educator at Harborview Medical Center in Seattle.

"It should protect against smallpox droplets, but is not a guarantee against the virus itself," she cautions.

At Harborview's ED, all new nursing staff receive training in tuberculosis given by the employee health department. The training includes discussion about administrative controls such as policies and screening, environmental controls such as isolation rooms, and use of personal protective equipment, including PAPRs. **(See resource box for information on obtaining PAPRs, above.)**

RESOURCES

3M offers the Breathe Easy RRPAS (Rapid Response Powered Air System) and Butyl Rubber Hood (BE 10) PAPR for use when decontaminating patients. Cartridges are available for protection against many industrial chemicals and military agents. For more information, contact:

- **3M Occupational Health and Environmental Safety Division**, 3M Center, Building 235-2E80, P.O. Box 33275, St. Paul, MN 55133-3275. Telephone: (800) 328-1667. Fax: (800) 542-9373 or (651) 736-0930. E-mail: occsafety@mmm.com. Web: www.3M.com/occsafety.

Neoterik Health Technologies offers positive-air pressure respirators to protect first responders after accidents or terrorist events. The "First Responder" series includes the FR2 PAPR with full facepiece or the FR3PAPR with full hood. For more information, contact:

- **Neoterik Health Technologies**, 401 S. Main St., Woodsboro, MD 27198. Telephone: (301) 845-2777. Fax: (301) 845-2213. E-mail: sales@neoterik.com.

The University of Alabama at Birmingham Bioterrorism web site (www.bioterrorism.uab.edu/) offers continuing education in Bioterrorism and Emerging Infectious Diseases. The site also contains information about smallpox. Click on "Emerging Infections and Potential Bioterrorist Agents," then under "Smallpox," click on "Summary" and/or "More Extensive Information."

The U.S. Army Medical Research Institute of Infectious Diseases offers a free download of its reference book, *Medical Management of Biological Casualties Handbook, Fourth Edition, February 2001*, at the following web address: usamriid.detrick.army.mil/education/bluebook.html.

The UCLA Department of Epidemiology, School of Public Health has extensive resources on its web site (www.ph.ucla.edu/epi/) Click on "Bioterrorism," and then "Smallpox."

Nurses watch a video on how to check the airflow of the respirator unit by placing a pressure flow cup in the tubing assembly, which is done with each use.

"The hospital switched to the PAPRs because the hoods require only a basic fitting, are not problematic with facial hair, and have no requirements about semiannual testing like the negative-pressured masks," says Matsuoka. "We are a large teaching facility, so the testing requirement was a huge issue."

Next, individual departments train nurses and provide the PAPR hoods. "I do it during the "sit-down" ED orientation day, when unit-specific issues are discussed," says Matsuoka.

In the ED, the PAPR hoods are kept in a four-drawer cart in a utility room across the hall from the isolation rooms. "The top drawer holds the flow cups and extra tubing assemblies, the second drawer holds extra hoods of both sizes, and the bottom two drawers are fitted for five PAPRs each with power charging units," she says.

It's a mistake to assume that a mask will protect you from smallpox, says **Sue C. Felt**, RN, MS, MPH, CIC, associate hospital epidemiologist and infection control coordinator at San Francisco General Hospital.

"All persons who were in the room or the vicinity of the patient should consider themselves exposed and get the vaccine," she says. "Public health should immediately arrange for this through the CDC."

Felt says the importance of hand washing can't be overemphasized. "Hand washing always reduces the risk of transferring illness," she says. "Though smallpox is spread via respiratory route, reminders about hand washing are always appropriate. It is the single most ignored infection control measure, everywhere."

Matsuoka advises limiting the time you spend in the isolation room. "Scrupulous hand washing, as with all body substance isolation practices, is warranted," she stresses.

Other types of personal protective equipment may not protect you from contracting smallpox, according to Felt. "I, myself, would wear an N95 mask — well placed and snug — and hope for the best," she says. "I would hope to get vaccinated within four days." ■

Pediatric CORNER

Use these tips for giving medications to children

Giving medicines to children can be trying even on your best days, says **Theresa Cromling**, RN, an advanced clinical staff nurse for the ED at Duke University Medical Center in Durham, NC.

"There are many reasons that giving medicine to your smallest patients can conjure up some bad memories," she says. "On many days, we may go home with several different doses of medicines on our scrubs."

Here are effective strategies to administer medications to pediatric patients:

• Use droppers to give oral medicines to infants.

When giving oral medicines to infants, Cromling recommends using a dropper or small syringe without the needle. "Drip the medicine into the side of the baby's mouth, keeping their head elevated," she advises.

Do not mix medicines with formula or juice because the medicine may not all be taken, adds Cromling.

• Use straws when giving pills to children.

If a school-age child has difficulty swallowing pills, Cromling recommends having the child put his or her pill in his or her mouth and lean forward. "Then have the child use a straw to drink some liquid and swallow the pill," she says.

• Don't allow threats.

Do not allow parents to threaten their children with a shot or medicine if they are not good, says Cromling. "Tell both the child and the parent that medicines are given only for medical reasons, not punishment," she adds. **(See related story on educating patients about medications, p. 35.)**

• Give children choices.

You can give children some control over what is happening to them, says **Nancy Blake**, RN, MN, CCRN, CNAA, director of critical care services at Children's Hospital in Los Angeles.

"You can ask kids if they want the shot on one side

EXECUTIVE SUMMARY

When giving medications to pediatric patients, allow parents to soothe them, avoid threats, and warn children if something will be painful.

- Give oral medicines to infants using a dropper or small syringe without the needle.
- Have children put pills in their mouths, use a straw to drink some liquid, and then swallow the pill.
- Add a small amount of ice cream, sherbet, pudding, or applesauce to bad-tasting medicines.

or the other, or in the arm or leg vs. the bottom," she suggests.

• Ask children for their help.

Blake recommends asking school-age children to assist with procedures, if possible. "For example, ask them to hold the dressing over the site where they get a shot," she says.

• Follow medicine with a treat.

Bad-tasting medicine goes down easier when given with a tasty treat, says Blake. "Ice cream, sherbet, pudding, or applesauce work well in hiding the taste," she says. "If a child is old enough for choices, he or she can choose what type of treat to put their medicine in."

• Don't lie.

Children must be able to trust what you are doing, says Blake. "If you give them reason to distrust you because you didn't tell them the truth, they will be unable to trust you in the future," she says.

If something is going to hurt, say so, but explain that you will do it as quickly as possible to get it over with, says Blake.

"If you do not prepare children, they will get upset, which could exacerbate their medical problem," she adds. "For example, children in respiratory distress will get worse if they get anxious. They need to be calm."

• Allow parents to hold children when giving nebulized medicines.

Nebulized medicines such as albuterol and Atrovent may be better tolerated by young children if the parent is allowed to hold them, suggests Cromling. "This may be a good time to read a story, listen to music, or use the rocking chair," she says.

Encourage the parent to be calm when their child is not, adds Cromling. "Both crying and calmness can be contagious," she says. "Parents should be encouraged to comfort their children during stressful times in the ED."

• Use explanations that are developmentally tailored.

Avoid using terminology that children don't understand, says Blake. "Nurses may use medical lingo that is way over a child's head," she adds. "Kids don't know what an IV is."

Cromling offers these suggestions to explain intramuscular (IM) injections for various age groups:

— **Infant:** Explain to the parents.

— **Toddler:** "This is going to be an ouch."

— **Preschooler:** "On the count of three, there will be a quick ouch."

— **School-age:** "This medicine is necessary for you to feel better, but it will be a quick ouch. I need your help so that it will go fast. Hold that bandage tightly, because I will need it as soon as I am done."

— **Adolescent:** Explain as you would to an adult patient.

SOURCES

For more information about medication administration for pediatric patients, contact:

- **Nancy Blake**, RN, MN, CCRN, CNAA, Children's Hospital Los Angeles, 4650 Sunset Blvd., Mailstop 74, Los Angeles, CA 90027. Telephone: (323) 669-2164. Fax: (323) 953-7987. E-mail: nBlake@chla.usc.edu.
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• Give IM medicines quickly and use eutectic mixture of local anesthetics (EMLA) if possible.

IM meds should be given as quickly as possible, advises Cromling. "Give the child a brief explanation just prior to the injection," she says.

If enough time is available, use a topical anesthetic agent such as EMLA cream on the area prior to giving the medicine, says Cromling.

"This procedure may be used for lumbar punctures and IV access," she says. "However, time constraints may be a factor because some of these topical applications take an hour to start to work." ■

Educate parents about medications

One evening, a 15-month-old weighing 22 pounds was brought to the ED by ambulance after having a febrile seizure.

"The child was post-ictal on arrival with a temperature of 103.6° rectally," recalls **Theresa Cromling**, RN, an advanced clinical staff nurse for the ED at Duke University Medical Center in Durham, NC.

The mother told ED nurses that the baby had a fever earlier in the day and that she had given her "a little bit of Tylenol." "The pediatrician's office had given her discharge instructions to 'continue giving Tylenol every four hours,'" says Cromling. The mother most likely administered too little of the medication, she explains.

The mother needed more specific instructions for the correct amount and frequency of the antipyretic to be given, she explains. Cromling gives the following example: "Give one teaspoon of children's-strength

Tylenol every four hours, and check the child's temperature one hour after giving the medication."

"Had this mom been given this important information with her first encounter, the ED visit and ambulance ride may not have been necessary," according to Cromling.

Although febrile seizures themselves are not life threatening because they are self-limiting, they are dangerous for another reason, notes Cromling. "There is the possibility of a compromised airway when the patient has a seizure," she warns. **(See discharge instructions for febrile seizure in children, inserted in this issue.)**

Unfortunately, the above scenario is common in the ED, says Cromling. "When pressed for time, education can fall by the wayside," she says.

ED nurses may have very brief interactions with parents and children, notes Cromling. "So you need to prioritize your time to include educational teaching for parents and caregivers about the administration of medicines to children," she says. **(See Ipecac Follow-Up care instructions inserted in this issue.)**

She suggests the following interventions:

• Give parents syringes to measure medications accurately.

The spoons that parents use to administer medicines to their children vary widely, says Cromling.

"This was shown during a study of medicine administration in our ED to check the accuracy of dosing amounts of antipyretics," she adds.

She recommends giving parents a syringe for consistent measuring of medicines for children.

• Direct education to frequently used medications.

Steroids, antibiotics, antipyretics, and analgesics are frequently prescribed in the ED, so you may want to focus your education on these medications, says Cromling.

• Tell parents to keep medications in their original bottles.

Parents need to be warned about putting medications in bottles that the medicine does not originally come in, says Cromling. She points to the common example of pouring children's-strength Tylenol into the infant-strength bottle because the bottle is smaller and fits easily into the diaper bag or purse.

If the bottle of the infant's strength is filled with the children's-strength Tylenol and administered with the dropper, the child will be getting only one-third the dose of medicine they are supposed to be receiving, she explains. "Therefore, you will fail to treat the fever and predispose younger children to febrile seizures," Cromwell says.

• Instruct parents to follow instructions to the letter.

Explain that if medicines are not given according to the prescription, the child may not be getting fever or pain relief, acute treatment for their asthma, or medication to fight the bacteria as intended, says Cromling.

Warn parents not to share medicines with their other children or change doses or times that medicines are given without first consulting their doctor, says Cromling. "Medicine is prescribed for children according to their weight," she adds. "If the wrong dose is given, the child may be underdosed or overdosed, both having their own negative ramifications." ■

Here are 10 ways to retain nursing staff

Are you aware of the latest statistics on the nursing shortage? A recent report from the General Accounting Office (GAO) found that the national unemployment rate for nurses is at its lowest level in over a decade. **(For information on ordering the report, see resource box on p. 37.)**

"The ED shortage is significant and will continue to see declining ranks, like many other specialty care areas," reports **Diana Contino**, RN, MBA, CEN, CCRN, president of Emergency Management Systems, a Monarch Beach, CA-based consulting firm that specializes in staffing issues.

The report also cites regional nurse shortages in several areas of the country and reports that hospitals are having growing difficulty recruiting nurses. "This is very dependent upon geographic location, proximity

EXECUTIVE SUMMARY

A recent report from the General Accounting Office says that the national unemployment rate for nurses is at its lowest level in more than a decade. It also reports regional nurse shortages.

- Decrease ED nurses' workload by delegating tasks to laboratory technicians, transporters, and radiology technicians.
- Find out how much nursing staff turnover is costing your ED, then spend those funds for adequate staffing and customer service programs.
- Improve education of nurses by encouraging acquisition of advanced degrees, sending nurses to computer classes, and training staff nurses to supervise technicians.

SOURCES AND RESOURCES

For more information about the nursing shortage, contact:

- **Diana Contino**, RN, MBA, CEN, CCRN, Emergency Management Systems, 24040 Camino Del Avion, Suite 123, Monarch Beach, CA 92629. Telephone: (949) 493-0039. Fax: (949) 493-7568. E-mail: dianas@home.com.
- **Janet K. Johnson**, RN, BSHA, CEN, SANE, Central Peninsula General Hospital, 250 Hospital Place, Soldotna, AK 99669. Telephone: (907) 262-8126. Fax: (907) 262-0717. E-mail: jjohnson@ cpgh.org.

A survey by the Florida Hospital Association has reported the highest nurse vacancy rate since 1989, with more than 90% of the hospitals responding reported a shortage of nurses in adult critical care, medical-surgical, emergency, and telemetry areas. The November 2001 report, *Florida's Nursing Shortage: It is Here and It is Getting Worse: FHA Study on Nurse Health Staffing Issues in Florida* can be downloaded free of charge at: www.fha.org/. An August 2001 report, *Finding and Keeping Nurses: What is Working? FHA Study on Recruitment and Retention*, identifies solutions for the nursing shortage. (Click on "Data/Publications," then "Nursing & Human Resources," then the report titles.) The *National Heart, Lung, and Blood Institute's Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma* (NIH Publication 97-4051) is $7 for single copies. An abbreviated version of the guidelines, *Practical Guide for the Diagnosis and Management of Asthma* (NIH Publication 97-4053), is $5 for single copies, with no shipping and handling charge for orders less than $6. To order, contact:

- **National Heart, Lung, and Blood Institute Information Center**, P.O. Box 30105, Bethesda, MD 20824. Telephone: (301) 251-1222. Web site: www.nhlbi.nih.gov.

A complete copy of the report, *Nursing Workforce: Emerging Nurse Shortages Due to Multiple Factors*, can be downloaded at www.gao.gov. Click on "GAO Reports," "Find GAO Reports," and under "Options" and "Find Reports by Report Number," enter "GAO-01-944." Single printed copies of the report are available at no charge by contacting U.S. General Accounting Office, P.O. Box 37050, Washington, DC 20013. Telephone: (202) 512-6000. Fax: (202) 512-6061. Web ordering form: www.gao.gov/cgi-bin/ordtab.pl.

to nursing schools, pay, and work environment," says Contino. **(See box for key findings of report, p. 38.)**

The bottom line is that EDs are finding ways to increase benefits and salaries for nurses to attract them, says Contino. "Nurses are in a position to be much more selective who they work for, including the registries," she adds.

The real challenge is retaining ED nurses, argues Contino. "There will always be a certain amount of turnover if the work environments are not improved," she says.

Here are effective ways to reduce vacancy rates:

1. Make your ED competitive.

As long as there is a shortage, nurses are in a position to negotiate education reimbursement, salaries, vacation, and schedules, so you'll need to be competitive in what you offer, says Contino.

"The economics of supply and demand impact nurses' ability to command higher salaries," she explains.

2. Give nurses opportunities to display their skills and knowledge.

Approach nurses in other departments to give lectures for ED staff, suggests **Janet K. Johnson**, RN, BSHA, CEN, SANE, coordinator of clinical forensic services and former ED nurse manager at Central Peninsula General Hospital in Soldotna, AK. This can help you find potential candidates for ED nurses, she adds.

This strategy worked well for Johnson, who leads a series of "Multidiscipline Patient Care Conferences," featuring a nurse or physician identifying an interesting patient who came through the ED, with presentations by all the departments who cared for the individual throughout his or her stay. After a lecture on burn patients, a new nurse in the intensive care unit approached Johnson to discuss the topic.

"We talked, and I found out she had great experience as a nurse in a burn center," she recalls. "She offered to lecture about burn care and dressings for us, and now she is working in the ED," she says.

3. Benchmark your staffing.

Contino advises comparing your staffing plans with other EDs in your area to see if your staffing is adequate.

Nursing shortage report: Here are key findings

Here are key findings of the U.S. General Accounting Office report on the nursing shortage, *Nursing Workforce: Emerging Nurse Shortages Due to Multiple Factors:*

A serious shortage of nurses is expected in the future as demographic pressures influence demand and supply.

Nationwide, the average change from 1996-2000 for nurses per 1,000 was -2%.

Alaska had a 19.5% decrease in employed registered nurses per 1,000 population from 1996-2000 for the biggest decline among all 50 states and Washington, DC. Arizona had the second biggest decline in nurses, with a 12.9% decrease. ■

"Having adequate staffing often decreases turnover," she says.

4. Decrease nursing workloads.

Delegate tasks to laboratory staff, patient transporters, and radiology technicians whenever you can, says Contino.

"Look at the LVN/LPN scopes of practice for your state," she suggests. "Can they do more than they are currently doing?"

5. Determine the cost of turnover.

After documenting the cost of turnover of nursing staff in your ED, "then lobby to spend that money on adequate staffing and customer service programs," advises Contino.

6. Make education a priority.

Raise endowment funds for nurse managers and staff education, says Contino. She points to the following goals:

• Teach staff nurses to be effective supervisors of LVN/LPNs and technicians.

• Send managers to mediation classes so they'll be more effective in resolving conflict.

• Require manager positions to be filled with persons having master's degrees.

"If you hire under those requirements, then help the employee reach the level within a certain timeframe," she says.

Pay a nurse to design a web page that educates the community about emergency services, and have the nurse work with the hospitals' public relations staff.

Provide tuition reimbursement for computer learning and advanced education.

7. Have nurse give patients follow-up calls.

Ask nurses to collect data about what patients want, Contino advises. "Then let the nurses collecting the data implement programs to make the ED more customer service-focused," she says.

8. Pay nurses to give talks at local schools.

The best source of future ED nurses may be your current nursing staff, says Contino.

"Nurses are excellent marketers if they feel passionate about where they work," she explains.

9. Hire local nursing students.

Put nursing students to work as technicians in your ED, with the agreement that they will be hired upon graduation if they meet certain requirements, says Contino.

10. Set up a "walk a mile in my shoes" program.

Contino suggests setting up a program to have nonclinicians spend a day with clinical staff, and vice-versa.

"It will greatly enhance teamwork and help employees to identify solutions," she says. ■

GUEST COLUMN

Children need adult advocates in the ED

By **Robert A. Wiebe**, MD, FAAP, FACEP
Professor and Director
Division of Emergency Medicine and Department of Pediatrics
UT Southwestern Medical Center
Dallas

Infants and young children don't have a vote. That's why they need adult advocates to represent their needs in an emergency setting.

In an unnamed hospital, an example of how a child advocate can make a difference was seen recently when a small abused child with extensive burns was having a dressing change without analgesia. The physician child advocate immediately recognized a lack of regard for pain in a small, defenseless pediatric patient. This was addressed systemwide with improved pain management and sedation protocols for burn dressing changes.

Many things are done to children that we would

RESOURCE

The American College of Emergency Physicians/ American Academy of Pediatrics (ACEP/AAP) policy statement, "Care of Children in the Emergency Department: Guidelines for Preparedness" (published in the April 2001 issues of *Pediatrics* and *Annals of Emergency Medicine*) can be downloaded free of charge from the AAP web site: www.aap.org. (Click on "Policy Statements." Under heading "C," click on "Care of children in the emergency department: Guidelines for preparedness.") Also, they can be purchased for $2.95 each, including shipping and handling. To order materials, contact:

- **AAP Publications Department**, P.O. Box 747, Elk Grove Village, IL 60009-0747. Telephone: (800) 433-9016 or (866) 843-2271. Fax: (847) 228-1281.

never do to adults because their complaints (in the form of crying) can go unheeded.

The recent guidelines from the Dallas-based American College of Emergency Physicians and the Elk Grove Village, IL-based American Academy of Pediatrics recommends that every ED have a nursing coordinator and a physician coordinator to address issues related to pediatric emergency care. **(For more information about the guidelines, see *ED Nursing*, June 2001, "New guidelines warn: You may not be prepared to take care of sick children," p. 101.)**

Qualifications for a physician coordinator include credentialing as a specialist in emergency medicine, pediatric emergency medicine, or pediatrics. The physician coordinator is required to have a special interest, knowledge, and skill in the emergency medical care of children. This must be demonstrated by training, clinical experience, and ongoing continuing medical education. This may be a shared role and, when local resources do not allow one, a physician coordinator may be appointed through formal consultation from professional resources of a hospital capable of providing definitive pediatric care.

The role of the physician coordinator is to oversee the quality and management of pediatric care patients and to serve as an advocate for children. This includes maintenance of a quality improvement program, quality physician performance, and pediatric clinical care protocols. This individual also will serve as a liaison for emergency medical services, out-of-hospital care, inter-facility transport, and as an interface with regional pediatric referral resources. He or she also serves as a facilitator for professional education in pediatric emergency care.

Qualities of a nursing coordinator

A nursing coordinator for pediatric emergency care must demonstrate interest, knowledge, and skill in emergency care and resuscitation of infants and children. They are responsible for coordinating and implementing quality improvement and clinical care protocols. They also serve as a nursing liaison for the out-of-hospital and in-hospital system of pediatric emergency care that includes EMS, interfacility transport, and regional referrals.

The nursing coordinator should work closely with the physician coordinator to ensure that policies and procedures and care plans are periodically reviewed and updated.

The roles of a nursing and physician coordinator need not be a separate defined individual but can be a shared role. The important issue is that this person advocates for and ensures that the needs of children are met in an emergency. Children need adult advocates.

[Editor's Note: Wiebe can be contacted at UT Southwestern Medical Center at Dallas, 1935 Motor St., Dallas, TX 75235. Telephone: (214) 456-6116. Fax: (214) 456-7736. E-mail: robert.wiebe@UT Southwestern.edu.] ■

NEWS BRIEF

Joint Commission report spotlights disaster planning

During your next survey with the Joint Commission on Accreditation of Healthcare Organizations, you'll notice surveyors paying extra attention to your disaster plan.

The Joint Commission has issued a special report on preparation for terrorist attacks involving biological, chemical, or nuclear incidents. The report also contains "lessons learned" from hospitals in New York and Washington, DC, following the Sept. 11 attacks.

Joint Commission surveyors will be paying "particular attention" to emergency management

SOURCE

For more information about the report, contact:

- **Michelle H. Pelling**, MBA, RN, The ProPell Group, P.O. Box 6052, Portland, OR 97228. Telephone: (503) 641-1987. E-mail: Michelle@propellgroup.com. Web: www.propellgroup.com.

planning, according to the report.

To begin with, you must be familiar with current Joint Commission standards for disaster planning, says **Michelle H. Pelling**, MBA, RN, president of The ProPell Group, a Portland, OR-based health care consulting firm specializing in compliance.

While considerations for disaster planning are addressed throughout the Environment of Care standards, the sections that specifically address disaster planning are: EC.1.4: Planning for emergency management; EC.2.4: Implementing the emergency management plan; and EC 2.9: Conducting emergency drills, says Pelling.

She points to two key priorities:

• to have clearly defined processes for responding to a disaster defined;

• to ensure that staff are educated as to what their responsibilities are and can articulate these responsibilities to surveyors. **(See checklist to assess your preparedness, right.)**

Surveyors will ask:

• Has the organization performed a hazard vulnerability analysis?

• What did it identify?

• How has the organizations addressed the findings?

Joint Commission surveyors are in a data-gathering mode, explains Pelling. "They want to be able to support health care organizations by providing them guidance and information on how they should prepare for potential terrorist attacks," she adds.

For example, the Joint Commission has offered a detailed explanation of what is required for EC.1.4, she notes.

"The items delineated in EC.1.4 primarily address the processes that organizations should have in place to respond and recover from a disaster that could result for a terrorist attack or other event," she says.

(Editor's Note: A complete copy of the Joint Commission report is available in a special issue of "Perspectives" at www.jcrinc.com/perspectivesspecial issue.) ■

Use this checklist to assess if you're prepared

To demonstrate your disaster preparedness during a survey with the Joint Commission on Accreditation of Healthcare Organizations, use the following checklist of questions developed by **Michelle H. Pelling**, MBA, RN, president of the ProPell Group, a health care consulting firm based in Portland, OR:

• Who will be responsible for notifying off-duty personnel?

• How will additional ***competent*** personnel be identified and accessed? Who, in addition to ED personnel, would be called to assist? What training might they need prior to the disaster so that they understand their role and are competent to assist?

• Who will take the lead in managing the response? How will they interact with communitywide agencies?

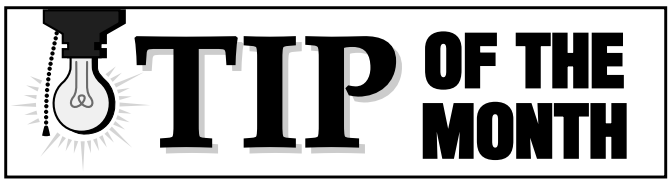
• How will security be managed for crowd control and family members?

• How will your current patients be managed? What processes for triaging and transferring will be in place?

• Will there be alternate sites within the organization where patient with less severe injuries can be triaged to and treated?

• How will patient information be controlled?

• How will critical supplies be accessed? ■



Teach patients to rinse after use of steroid inhaler

Inhaled corticosteroid therapy is the most effective controlling medication used for the treatment of asthma, says **Steven D. Glow**, RN, MSN, FNP, CEN, EMT-P, nursing faculty at Salish Kootenai College in Pablo, MT, and former ED nurse at Lutheran Medical Center in Wheat Ridge, CO.

"Unfortunately, some of the medication is deposited in the patient's mouth during inhaler use," he says. "This can cause an overgrowth of the normal oral flora and result in the fungal infection known as thrush."

Patients discharged after treatment for thrush or with a new prescription for an inhaled steroid should be cautioned to rinse their mouths after using the steroid inhaler, says Glow. "However, many patients have difficulty remembering this important step," he says. "I counsel my patients to use the inhaler just prior to brushing their teeth. This will reduce the incidence of thrush as well as promote good dental hygiene."

[*Editor's Note: For more information, contact Steven D. Glow, RN, MSN, FNP, CEN, EMT-P, Salish Kootenai College, P.O. Box 117, 52000 Highway 93, Pablo, MT 59855. Telephone: (406) 275-4922. Fax: (406) 275-4806.* E-*mail: Steve_Glow@skc.edu.]* ■

WEB ALERT

Web site offers tools for culturally diverse care

Are you looking for resources to improve care of culturally diverse populations? If so, The Manager's Electronic Resource Center web site developed by Management Sciences Health, a nonprofit public health education organization based in Boston, may be of help.

The site's primary goal is to help health care providers working in developing countries to improve care, but ED nurses will also find "a wealth of useful information" on the site, says **James Wolff**, MD, FACEP, an attending physician for the department of emergency medicine at Concord, MA-based Emerson Hospital and one of the site's developers.

Here are some of the areas the site provides resources for:

• **Caring for culturally diverse groups.**

The site features a "Guide to Quality and Culture," developed in collaboration with the Washington, DC-based Bureau of Primary Health Care.

"This features practical information that ED nurses can use to anticipate the needs and expectations of patients from different cultural groups," says Wolff.

You quickly can test your knowledge about caring for diverse populations by taking the 21-question quiz.

The quiz tests your knowledge about caring for various cultural groups and directs you to links for additional information about such topics as working with an interpreter and common health problems in selected minority, ethnic, and cultural groups.

• **Meeting guidelines from translation in the ED.**

You can use the "Providers Guide to Quality and Culture" to improve the way you handle translation in your ED, says Wolff. The guide also includes links to other sites with more information about policies, guidelines, and operational issues for translation.

This can help you set up a program to comply with the Title VI of the Civil Rights Act of 1964, adds Wolff. He points to the Aug. 30, 2000, Office for Civil Rights Policy Guidance (www.hhs.gov/ocr/lep/guide.html), which says that the use of family members and friends as interpreters is not adequate.

The guide also gives tips for effective communication with African-Americans, Asian-Americans, Hispanics/Latinos, Native Americans, and Pacific Islanders.

• **Using improved management tools.**

The site features a "Health Manager's Toolkit," an assortment of electronic management tools developed by various agencies around the world.

"ED nurses will find the large number of tools available very useful for departmental assessments, developing policies, or training nursing and ancillary staff," says Wolff.

The tools include a Health Plan Employer Data and Information Set, Integrated Health Facility Assessment Manual, Inventory Management Assessment Tool, Quality Assurance Manual, and a Performance Improvement Review Package.

• **Determining the price of medications.**

Use the International Drug Price Indicator Guide to find out the cost of various medications used in the ED, says Wolff.

"It contains updated prices for essential drugs from many different suppliers," he adds.

• **Developing of quality improvement programs.**

The site's *Guide to Managing for Quality* can help you to develop an effective quality improvement program, says Wolff.

"It contains case scenarios, quality improvement tools with instructions, and guidelines for setting up a

Vital Signs
Site: The Manager's Electronic Resource Center
Address: www.erc.msh.org
For more information about the site, contact:
James Wolff, MD, FACEP, Management Sciences for Health, 165 Allandale Ave., Boston, MA 02130-3400. Telephone: (617) 524-7799. Fax: (617) 524-2825. E-mail: jwolff@msh.org.

quality improvement team in your ED," he explains.

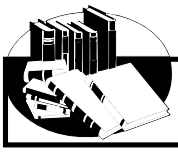
• **Planning events.**

The site includes information in planning an event, managing group dynamics during an event, and monitoring progress toward achieving the desired outcomes of an event.

• **Reducing delays in the ED.**

The site contains tips for reducing waiting times in the ED, including an article on this topic from the "Manager," a continuing management education publication.

"You can use the checklist for reducing client waiting times as a way to start talking about waiting time issues with ED staff," suggests Wolff. ■



JOURNAL REVIEW

Nerney MP, Chin MH, Jin L, et al. **Factors associated with older patients' satisfaction with care in an inner-city emergency department.** *Ann Emerg Med* 2001; 38:140-145.

Older patients want specific things from an ED visit, say researchers from the University of Chicago. In this study, 778 patients aged 65 years and older who presented at an urban academic ED between 1995 and 1996 were given a survey on demographic information, medical history, and health-related quality-of-life information. A follow-up satisfaction survey asked patients to rate the care they received in the ED on a five-point scale, ranging from poor to excellent.

According to the study's findings, 40% of respondents rated their ED care as "excellent." The patients who rated care as excellent also tended to report the following observations about their ED visit:

• they perceived that the time spent in the ED was "not too long";

• they felt that the ED physicians and nurses clearly answered their questions;

• they had established a relationship of trust with an ED staff member;

• they recalled being given explanations about why tests were being done;

• they felt involved in decisions about their care;

• their pain was addressed fully;

• they had fewer comorbid conditions at the time of the ED visit.

The researchers noted that although patient's perception of time as "not too long" was a strong predictor of patient satisfaction, the actual time spent in the ED did not vary significantly, regardless of how the patient rated the ED visit.

Elderly patients who believed that staff did everything possible to relieve the patients' pain was a strong predictor of satisfaction, the study found. "Pain untreated or even unacknowledged by ED staff will only increase anxiety and contribute to the patient's perception that health care providers are not concerned about them mentally or physically," the researchers wrote.

The study brought to light the special needs of many elderly patients, including poor social function that could limit the ability to provide a history or understand discharge instructions, unrelated health problems that complicate a patient's treatment, and a perception of poor health status that leads to increased concerns, say the researchers.

"Mindfulness of older adults' special needs and concerns in the ED should improve their satisfaction with ED care," they conclude. ■

CALENDAR

• **ENA Leadership Challenge** — Feb. 28-March 3, 2002, Charlotte, NC. Sponsored by Emergency Nurses Association. Contact: Emergency Nurses Association, 915 Lee St., Des Plaines, IL 60016. Telephone: (800) 243-8362. Fax: (847) 460-4001. E-mail: enainfo@ena.org.

• **2002 National Congress on Childhood Emergencies** — April 15-17, 2002. Sponsored by Emergency Medical Services for Children (EMSC) program. Contact: EMSC, 8737 Colesville Road, Suite 400, Silver Spring, MD 20910. Telephone: (202) 884-4927. Fax: (202) 884-6845. Web: www.ems-c.org. ■

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Editorial Questions

For questions or comments, call Joy Daughtery Dickinson at (229) 377-8044.

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THOMSON
AMERICAN HEALTH CONSULTANTS

CE objectives

[For more information about the CE program, contact American Health Consultants at (404) 688-2421.]

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

1. Identify clinical, regulatory, or social issues relating to ED nursing. (See *Emergency department nurses may be first to notice a smallpox outbreak; Use these tips for giving medications to children, Journal Review, Teach patients to rinse after use of steroid inhaler* in this issue.)
2. Describe how those issues affect nursing service delivery.
3. Cite practical solutions to problems and integrate information into the ED nurse's daily practices, according to advice from nationally recognized experts. ■

CE*questions*

1. Which of the following is true of the rash characteristic of smallpox, according to Maureen Titus, RN, CIC, director of infection control at Carolinas Medical Center?
   A. The rash progresses uniformly, and all lesions have the same appearance.
   B. The rash usually begins on the trunk and spreads to the face.
   C. Lesions are in different stages at the same time.
   D. The rash usually begins on the distal extremities.

2. Which is an effective way to administer medications to pediatric patients, according to Theresa Cromling, RN, an advanced clinical staff nurse for the ED at Duke University Medical Center?
   A. Discourage parents from holding children during nebulizer treatments.
   B. Avoid using EMLA cream for lumbar punctures.
   C. Routinely mix medicines with formula or juice.
   D. Have children drink liquid from straws before swallowing pills.

3. Which of the following was reported by elderly patients who were satisfied with their ED visit, according to a study published in *Annals of Emergency Medicine?*
   A. Patients felt involved in decisions about their care.
   B. No more than two diagnostic tests were performed.
   C. Patients were given written discharge instructions.
   D. Family members were permitted to accompany patients in treatment rooms.

4. What should you tell asthma patients about inhaled corticosteroid therapy, according to Steven D. Glow, RN, MSN, FNP, CEN, EMT-P, nursing faculty at Salish Kootenai College?
   A. Inhaled corticosteroid therapy should not be used.
   B. Patients should rinse their mouths after using a steroid inhaler.
   C. There is no increased risk of thrush from steroid inhaler use.
   D. The inhaler should be used after brushing teeth.

FEBRILE SEIZURE IN CHILDREN

AfterCare® Instructions

WHAT YOU SHOULD KNOW:

- A febrile seizure (c-zure) or convulsion (kun-vull-shun) is an attack caused by a high fever. During a seizure, the electrical activity in the brain is not normal. The brain seems to act as if it is having an electrical storm during the seizure. Febrile seizures are the most common kind of seizure and are usually not harmful. Seizures may scare you because you think your child may die. But the seizure usually does not cause brain damage and is not as serious as it looks. A febrile seizure may last 1 to 10 minutes.

- Children between 6 months and 6 years are more likely to have a febrile seizure. Some children who have had a febrile seizure may have another seizure with a high fever. But the risk of having another febrile seizure decreases after your child is 3 years.

INSTRUCTIONS:

- If your child develops a fever, sponge bathe him or her to try to reduce the fever. A sponge bath should be done in a warm room with warm water. Using a damp washcloth, gently rub the entire body. Your child should feel damp but not dripping wet. Do not use a fan or ice or cold water, and do not chill the child.

- During a convulsion, protect the child from injury by moving dangerous objects away. Do not try to hold the child down.

- If your child has another febrile seizure, write down details for the doctor, including when it began, whether both sides of the body were jerking, how long the convulsion lasted, how long it was after the child's fever went up that the seizure occurred, and if the child slept afterward.

CALL IF:

- The child still has a fever 3 days after the febrile seizure or uncontrolled fever of any duration.

RETURN IMMEDIATELY IF:

- Your child has another convulsion.

- Your child is injured during a convulsion.

- Your child develops vomiting, headache, or a stiff neck.

IPECAC FOLLOW-UP

AfterCare® Instructions

WHAT YOU SHOULD KNOW:

Your child may have swallowed a substance that could be harmful to the body. The caregiver gave your child ipecac to cause vomiting and to empty the stomach. For a short time after vomiting, your child may have mild stomach cramps and loose BMs.

INSTRUCTIONS:

- Your child's medicines are: _____
  - Keep a written list of what medicines your child takes and when and why he or she takes them. Bring the list of your child's medicines or the pill bottles when you see your child's caregiver. Ask your caregiver for information about your child's medicines. Do not give your child any medicine without first talking to caregivers.
  - Always give your child his medicine as directed by caregivers. Call your child's caregiver if you think the medicines are not helping or if you feel your child is having side effects. Do not quit giving it until you discuss it with your caregiver. If your child is taking antibiotics (an-ti-bi-ah-tiks), give them until they are all gone even if you think your child feels better.
- Do not give your child anything to eat or drink for the next 1 to 2 hours. After this time, you may give your child:
  - First, clear liquids such as apple juice or clear sodas.
  - Solid foods, if he or she does not vomit the liquids.
- Keep your child as quiet as possible for the next 2 hours.
- Poison-proof your home to keep it safe for your child. Lock up or put out of reach medicines and other things that could harm your child. Keep syrup of ipecac locked up in your medicine cabinet.
- Keep a large bowl or bucket near your child to be ready for more vomiting. Have your child sleep or nap on his or her side or stomach. If your child vomits while lying on his or her back, the vomit may go into his or her lungs. Your child may have pain in his or her abdomen (belly) for a while after vomiting. He or she also may have loose BMs.

- If you think your child has swallowed something harmful again, quickly call caregivers or the Poison Control Center. DO NOT give your child ipecac unless caregivers or the Poison Control Center tell you to do so. The phone number of the Poison Control Center is: _____

CALL IF:

- Your child vomits more than 3 or 4 times or if vomiting lasts more than 1 to 2 hours.
- Your child has severe abdominal (belly) cramps or pain.
- Your child develops any sign or symptom that your caregiver warned you about.

RETURN IMMEDIATELY IF:

- Your child is hard to awaken or has trouble breathing. **THIS IS AN EMERGENCY** . Call **O (operator)** or **911** for medical help.
- Your child has a seizure (convulsion).

Excerpt: Vaccinia (Smallpox) Vaccine Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2001

Summary

These revised recommendations regarding vaccinia (smallpox) vaccine update the previous Advisory Committee on Immunization Practices (ACIP) recommendations (MMWR 1991; 40; No. RR-14:1-10*) and include current information regarding the nonemergency use of vaccinia vaccine among laboratory and health care workers occupationally exposed to vaccinia virus, recombinant vaccinia viruses, and other* Orthopoxviruses *that can infect humans. In addition, this report contains ACIP's recommendations for the use of vaccinia vaccine if smallpox (variola) virus were used as an agent of biological terrorism or if a smallpox outbreak were to occur for another unforeseen reason.*

INTRODUCTION

Variola virus is the etiological agent of smallpox. During the smallpox era, the only known reservoir for the virus was humans; no known animal or insect reservoirs or vectors existed. The most frequent mode of transmission was person-to-person, spread through direct deposit of infective droplets onto the nasal, oral, or pharyngeal mucosal membranes, or the alveoli of the lungs from close, face-to-face contact with an infectious person. Indirect spread (i.e., not requiring face-to-face contact with an infectious person) through fine-particle aerosols or a fomite containing the virus was less common.

Symptoms of smallpox begin 12-14 days (range: 7-17) after exposure, starting with a two- to three-day prodrome of high fever, malaise, and prostration with severe headache and backache. This pre-eruptive stage is followed by the appearance of a maculopapular rash (i.e., eruptive stage) that progresses to papules one to two days after the rash appears; vesicles appear on the fourth or fifth day; pustules appear by the seventh day; and scab lesions appear on the 14th day. The rash appears first on the oral mucosa, face, and forearms, then spreads to the trunk and legs. Lesions might erupt on the palms and soles as well. Smallpox skin lesions are deeply embedded in the dermis and feel like firm round objects embedded in the skin. As the skin lesions heal, the scabs separate and pitted scarring gradually develops. Smallpox patients are most infectious during the first week of the rash when the oral mucosa lesions ulcerate and release substantial amounts of virus into the saliva. A patient is no longer infectious after all scabs have separated (i.e., three to four weeks after the onset of the rash).

During the smallpox era, overall mortality rates were approximately 30%. Other less common but more severe forms of smallpox included: a) flat-type smallpox with a mortality rate >96% and characterized by severe toxemia and flat, velvety, confluent lesions that did not progress to the pustular stage; and b) hemorrhagic-type smallpox, characterized by severe prodromal symptoms, toxemia, and a hemorrhagic rash that was almost always fatal, with death occurring 5-6 days after rash onset.

Vaccinia vaccine is a highly effective immunizing agent that enabled the global eradication of smallpox. The last naturally occurring case of smallpox occurred in Somalia in 1977. In May 1980, the World Health Assembly certified that the world was free of naturally occurring smallpox. By the 1960s, because of vaccination programs and quarantine regulations, the risk for importation of smallpox into the United States had been reduced. As a result, recommendations for routine smallpox vaccination were rescinded in 1971. In 1976, the recommendation for routine smallpox vaccination of health care workers also was discontinued. In 1982, the only active licensed producer of vaccinia vaccine in the United States discontinued production for general use, and in 1983, distribution to the civilian population was discontinued. All military personnel continued to be vaccinated, but that practice ceased in 1990. Since January 1982, smallpox vaccination has not been required for international travelers, and International Certificates of Vaccination forms no longer include a space to record smallpox vaccination.

Currently, international concern is heightened regarding the potential use of smallpox (variola) virus as a bioterrorism agent. Because of these concerns, ACIP has developed recommendations for vaccinia (smallpox) vaccine regarding the potential use of smallpox virus as a biological weapon. Additionally, recommendations regarding vaccination of persons working with highly attenuated strains or recombinant vaccines derived from highly attenuated strains of vaccinia virus have been revised.

SMALLPOX VACCINE FOR BIOTERRORISM PREPAREDNESS

Although use of biological agents is an increasing threat, use of conventional weapons (e.g., explosives) still is considered more likely in terrorism scenarios. Moreover, use of smallpox virus as a biological weapon might be less likely than other biological agents because of its restricted availability; however, its use would have substantial public health consequences. Therefore, in support of current public health bioterrorism preparedness efforts, ACIP has developed the following recommendations if this unlikely event occurs.

Surveillance

A suspected case of smallpox is a public health emergency. Smallpox surveillance in the United States includes detecting a suspected case or cases, making a definitive diagnosis with rapid laboratory confirmation at CDC, and preventing further smallpox transmission. A suspected smallpox case should be reported immediately by telephone to state or local health officials and advice obtained regarding isolation and laboratory specimen collection. State or local health officials should notify CDC immediately at (404) 639-2184, (404) 639-0385, or (770) 488-7100 if a suspected case of smallpox is reported. Because of the problems previously encountered in Europe with health care-associated smallpox transmission from imported cases present in a hospital setting, health officials should be diligent regarding use of adequate isolation facilities and precautions (see Infection Control Measures). Currently, specific therapies with proven treatment effectiveness for clinical smallpox are unavailable. Medical care of more seriously ill smallpox patients would include supportive measures only. If the patient's condition allows, medical and public health authorities should consider isolation and observation outside a hospital setting to prevent health care-associated smallpox transmission and overtaxing of medical resources. Clinical consultation and a preliminary laboratory diagnosis can be completed within eight to 24 hours. Surveillance activities, including notification procedures and laboratory confirmation of cases, might change if smallpox is confirmed.

Prerelease Vaccination

The risk for smallpox occurring as a result of a deliberate release by terrorists is considered low, and the population at risk for such an exposure cannot be determined. Therefore, pre-exposure vaccination is not recommended for any group other than laboratory or medical personnel working with nonhighly attenuated Orthopoxviruses. Recommendations regarding pre-exposure vaccination should be on the basis of a calculable risk assessment that considers the risk for disease and the benefits and risks regarding vaccination. Because the current risk for exposure is considered low, benefits of vaccination do not outweigh the risk regarding vaccine complications. If the potential for an intentional release of smallpox virus increases later, pre-exposure vaccination might become indicated for selected groups (e.g., medical and public health personnel or laboratorians) who would have an identified higher risk for exposure because of work-related contact with smallpox patients or infectious materials.

Postrelease Vaccination

If an intentional release of smallpox (variola) virus does occur, vaccinia vaccine will be recommended for certain groups. Groups for whom vaccination would be indicated include:

- persons who were exposed to the initial release of the virus;
- persons who had face-to-face, household, or close-proximity contact (<6.5 feet or 2 meters) with a confirmed or suspected smallpox patient at any time from the onset of the patient's fever until all scabs have separated;
- personnel involved in the direct medical or public health evaluation, care, or transportation of confirmed or suspected smallpox patients;
- laboratory personnel involved in the collection or processing of clinical specimens from confirmed or suspected smallpox patients; and
- other persons who have an increased likelihood of contact with infectious materials from a smallpox patient (e.g., personnel responsible for medical waste disposal, linen disposal or disinfection, and room disinfection in a facility where smallpox patients are present).

Infection Control Measures

Isolation of confirmed or suspected smallpox patients will be necessary to limit the potential exposure of nonvaccinated and, therefore, nonimmune persons. Although droplet spread is the major mode of person-to-person smallpox transmission, airborne transmission through fine-particle aerosol can occur. Therefore, airborne precautions using correct ventilation (e.g., negative air-pressure rooms with high-efficiency particulate air filtration) should be initiated for hospitalized confirmed or suspected smallpox patients, unless the entire facility has been restricted to smallpox patients and recently vaccinated persons. Although personnel who have been recently vaccinated and who have a demonstrated immune response should be fully protected against infection with variola virus, they should continue to observe standard and contact precautions (i.e., using protective clothing and shoe covers) when in contact with smallpox patients or contaminated materials to prevent inadvertent spread of variola virus to susceptible persons and potential self-contact with other infectious agents. Personnel should remove and correctly dispose of all protective clothing before contact with nonvaccinated persons. Reusable bedding and clothing can be autoclaved or laundered in hot water with bleach to inactivate the virus. Laundry handlers should be vaccinated before handling contaminated materials.

Nonhospital isolation of confirmed or suspected smallpox patients should be of a sufficient degree to prevent the spread of disease to nonimmune persons during the time the patient is considered potentially infectious (i.e., from the onset of symptoms until all scabs have separated). Private residences or other nonhospital facilities that are used to isolate confirmed or suspected smallpox patients should have nonshared ventilation, heating, and air-conditioning systems. Access to those facilities should be limited to recently vaccinated persons with a demonstrated immune response. If suspected smallpox patients are placed in the same isolation facility, they should be vaccinated to guard against accidental exposure caused by misclassification as someone with smallpox.

In addition to isolation of infectious smallpox patients, careful surveillance of contacts during their potential incubation period is required. Transmission of smallpox virus rarely occurs before the appearance of the rash that develops two to four days after the prodromal fever. If a vaccinated or unvaccinated contact experiences a fever >101° F (38° C) during the 17-day period after his or her last exposure to a smallpox patient, the contact should be isolated immediately to prevent contact with nonvaccinated or nonimmune persons until smallpox can be ruled out by clinical or laboratory examination.

Source: Centers for Disease Control and Prevention, Atlanta.

BIOTERRORISM WATCH
Preparing for and responding to biological, chemical and nuclear disasters

Ring of Fire: CDC plan to immunize around first smallpox cases has the devil in the details

Used successfully to eradicate smallpox in 1980

Should a bioterrorist strike with smallpox, the Centers for Disease Control and Prevention's (CDC's) recently released response plan calls for investigators to rapidly immunize a "ring" around the first cases. The ring concept calls for isolation of confirmed and suspected smallpox cases followed by contact tracing, vaccination, and close surveillance of contacts.

"Ring vaccination — sometimes called search and containment —- is identifying individuals with confirmed smallpox and then identifying and locating those people who came in contact with that person, and vaccinating those people in outward rings of contact," says **Harold Margolis**, MD, CDC senior adviser for smallpox preparedness. "This produces a buffer of immune individuals and was shown to prevent smallpox and to ultimately eradicate this disease."

Indeed, the ring approach was used to successfully eradicate smallpox from the world in 1980. The only officially acknowledged stocks of live virus remaining are in the United States and Russia, but bioterrorism experts have long feared that smallpox may have fallen into other hands.

But the ring concept was effective when the demographics of smallpox were very different, when few were infected and the vast majority of people were already immune. The CDC plan acknowledges as much, noting that several current factors could contribute to a more rapid spread of smallpox than was routinely seen before this disease was eradicated.

These factors include virtually nonexistent immunity to smallpox, increased mobility of the population, and delayed recognition of smallpox by health personnel who are unfamiliar with the disease, the plan states. Concerning the latter — similar to the fine line between initial symptoms of anthrax and influenza — one of the most confounding differential diagnoses for smallpox is chickenpox. **(See related story, p. 3.)**

Preemptive strike

While the ring strategy is a classic public health approach, some favor a more aggressive preemptive action in this new age of bioterrorism: Immunize response teams of health care workers throughout the nation.

"I would be in favor of a plan to prospectively immunize not only the strike force at the federal level, but [also] a cadre of people in each state," says **William Schaffner**, MD, chairman of preventive medicine at Vanderbilt University in Nashville.

Having groups of health care workers immunized in advance could also be critical if the "ring" is difficult to perceive, he notes.

"We think of it conceptually as a ring, but clearly people are not all in one geographic area," he says. "The people who may or may not have contact with this first case will be scattered all over the community. They went shopping

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there, had a church group here, and then they played bridge. The first thing we will be looking for is information from public health authorities about who is within the ring and who is outside the ring. If that is not articulated with great clarity everybody is going to be in deep trouble."

The CDC is certainly aware of such issues and concerns, and discussions are still ongoing within the agency about preemptively immunizing some health care workers. "We have to weigh the risks and benefits of vaccination for any group, and that would include health care workers. We are kind of working through those issues right now," **Lisa Rotz**, MD, medical epidemiologist in the CDC bioterrorism response program, tells *Bioterrorism Watch.*

The overriding factor in holding back immunization of health care workers is the hazards and side effects of the vaccine.

"In 1972 we actually discontinued routine vaccination [in the United States] because the risks of adverse events from the vaccine outweighed the risk of any one person coming down with smallpox, even though it was still occurring in other parts of the world," Rotz says. "I think that still holds true here. We are dealing with a vaccine that presents problems in and of itself."

Indeed, death occurs in about one per million primary vaccinations, usually as a result of progressive vaccinia, post-vaccinal encephalitis, or severe eczema vaccinatum. Other adverse events include inadvertent inoculation from the vaccinated site (e.g., to the eyes).

CDC will bring vaccine within 'hours'

In addition, the CDC has immunized approximately 100 of its personnel, who could be dispatched immediately to a stricken area and begin investigating and administering vaccine.

"We have people trained to respond to smallpox who can go rapidly to an area to evaluate a case, and then help the local and state officials begin implementing control measures," Rotz says. "That would include helping them implement surveillance, making sure we have identified people who need to be vaccinated right away and to start setting that up. We would get things started there until they get their own response up and running."

But instead of immunizing health care workers in advance, the CDC plan is to administer the vaccine after a case occurs. The CDC could deliver personnel and vaccine within "hours" to any area in the country, Rotz says. Moreover, the vaccine can be effective up to four days after infection sets in, and may prevent death in the patient.

Among the top priority for immunizations after smallpox is reported are "those involved in the direct medical care, public health evaluation, or transportation of confirmed or suspected smallpox patients," the CDC plan states. **(See story on priority immunization groups, p. 3.)** In addition, smallpox patients would be placed under airborne precautions similar to that used for tuberculosis patients, who are placed in negative pressure rooms (vented outside) and treated by workers with respirators.

Another important factor in favor of the CDC approach is that smallpox is not communicable in its incubation period, says **D.A. Henderson**, MD, director of the office of public health preparedness at the Department of Health and Human Services in Washington, DC.

"You have an incubation period of 10 to 12 days when the individual feels perfectly well and is not able to transmit infection," he says. "Then he gets a fever for a couple of days and then the rash. It's only when the rash begins that the individual transmits the disease. So, in fact, [those are] the people we're really concerned about isolating so that they don't transmit the disease. But just because somebody's infected does not mean that they're going to transmit infection during that incubation period. They won't do that."

Into the thousands very quickly

Still, while emphasizing that the CDC plan is a good starting point, Schaffner argues that it would make sense — and allay subsequent chaos — to immunize groups of health care workers before an event occurs.

"The immediate [CDC] public health strike team is like being out on the beach and walking in up to your ankles, but the next step you take gets you into water over your head," he says. "Because if you start thinking about [immunizing health care workers], you're talking about emergency personnel, ambulance drivers, infectious disease doctors, [and] nurses in hospitals who would be designated to care for such patients. It could get into the many thousands very quickly."

In addition, with the exception of the recently trained CDC personnel, few clinicians in the country know how to administer the smallpox vaccine using the "little pitchfork" bifurcated needle.

"That is one potential benefit of vaccinating a group of first responders around the country,"

Schaffner says. "You train these people how to administer the vaccine and all of sudden you have a bunch of trained people out there that we haven't had before. I think that would be a substantial additional benefit." ■

Health workers, contacts priority for vaccination

Others include lab personnel and waste disposal

According to the Centers for Disease Control and Prevention (CDC), the following groups should be a high priority for smallpox vaccination should a bioterrorism release of the pathogen occur:

1. Face-to-face close contacts (less than or equal to 6.5 feet or 3 meters), or household contacts to smallpox patients after the onset of the smallpox patient's fever. Although individuals with smallpox are not infectious until the onset of rash, vaccinating contacts from the time of the onset of fever helps provide a buffer and assures that contacts who may have been exposed at the early onset of rash, when the rash may have been faint and unrecognized, have been vaccinated.

2. People exposed to the initial release of the virus (if the release was discovered during the first generation of cases and vaccination may still provide benefit).

3. Household members (without contraindications to vaccination) of contacts to smallpox patients' (to protect household contacts should smallpox case contacts develop disease while under fever surveillance at home).

Household members of contacts who have contraindications to vaccination should be housed eparately from the other vaccinated household members until the vaccination site scab has separated (approximately two weeks) to prevent inadvertent transmission of vaccinia virus. They should also be housed separately from the contact until the incubation period for smallpox has passed and the contact is released from surveillance.

4. People involved in the direct medical care, public health evaluation, or transportation of confirmed or suspected smallpox patients (this includes personnel whose public health activities involve direct patient contact such as case interviewing).

5. Laboratory personnel involved in the collection and/or processing of clinical specimens from suspected or confirmed smallpox patients.

6. Other people who have a high likelihood of exposure to infectious materials (e.g., personnel responsible for hospital waste disposal and disinfection).

7. Personnel involved in contact tracing and vaccination, or quarantine/isolation or enforcement, or law-enforcement interviews of suspected smallpox patients.

8. People permitted to enter any facilities designated for the evaluation, treatment, or isolation of confirmed or suspected smallpox patients. (Only essential personnel should be allowed to enter such facilities.) Only personnel without contraindications to vaccination should be chosen for activities that would require vaccination for their protection. Personnel with contraindications should not perform duties that would place them at risk for smallpox exposure and should otherwise only be vaccinated if an exposure already has occurred.

9. People present in a facility or conveyance with a smallpox case if fine-particle aerosol transmission was likely during the time the case was present (e.g. hemorrhagic smallpox case and/or case with active coughing). Evaluation of the potential risk for aerosol transmission and initiation of vaccination for non-direct contacts will be done by CDC, state, and local public health personnel. The decision to offer vaccination to non-direct contacts of smallpox cases will be made jointly by federal and the state health officials. ■

Smallpox or chickenpox? How to make the diagnosis

Rash progression, location, will be different

Smallpox or chickenpox? That clinical question has been long confined to the academic dustbin in the United States, where the last case of smallpox (variola) was diagnosed in 1949 in Texas.

Smallpox has been vanquished yet is still feared; chickenpox (varicella) remains a fairly common pediatric infection. Continuing use of the varicella vaccine (recommended for use in the United States in 1996) should continue to reduce cases of chickenpox in the years to come. With

Smallpox vs. Chickenpox

	Variola	Varicella
Incubation	7-17 days	14-21 days
Fever prodrome	2-4 days	minimal/none
Distribution	face/extremities	trunk/clusters
Progression	synchronous	synchronous
Scab formation	10-14 d p* rash	4-7 d p* rash
Scab separation	14-28 d p* rash	<14 d p* rash
Lesions soles/palms	yes	no

** d p = days after rash onset*

Source: Centers for Disease Control and Prevention, Atlanta.

bioterrorism a reality and a whole generation of medical students having never seen a case of smallpox, the Centers for Disease Control and Prevention (CDC) is again emphasizing the classic distinctions between the two poxes.

Though similar at onset, the two rash diseases take distinctly different progressions that provide more than a few telltale signs, says **Lisa Rotz**, MD, medical epidemiologist in the CDC bioterrorism response program. **(See chart, above.)**

"The incubation period for both diseases spans similar time periods, but we do see a longer incubation period in the development of chickenpox as opposed to smallpox," she says.

Usually symptoms such as high fever, malaise, and backache will proceed development of rash in smallpox cases. On the contrary, fever associated with chickenpox generally appears in conjunction with the first signs of rash.

"You will also see a different distribution of lesions of the rash between the two diseases," Rotz says. "In general, smallpox lesions are much more numerous on the face and extremities."

In contrast, chickenpox lesions are more numerous on the trunk, and occur in clots or clusters. Moreover, as rash progresses in smallpox, the lesions in a particular area of the body progress along the same lines and appear similar.

"Whereas in varicella in any one area of the body you may see lesions in different levels of progression," she says. "You might see a vesicle next to a scab. Also the rash of varicella progresses much more quickly and resolves more quickly than the rash of smallpox. So the overall illness has a much shorter course for chickenpox vs. smallpox."

As opposed to chickenpox, smallpox also will reveal itself through lesions on the soles and palms of those infected. Despite the disease names, chickenpox lesions are usually smaller than those created by smallpox.

"It is difficult to distinguish early on between the two diseases, but they quickly diverge in their rash progression," Rotz says. "By day five a child with smallpox is showing increasing numbers of lesions still occurring on the face, while the child with chickenpox has about the same number of lesions on the face as appeared on day three. By day seven the rash is still progressing in the patient with smallpox but seems to be resolving in the child with chickenpox."

Though smallpox patient isolation measures are understandably more stringent, the patient isolation guidelines for the two diseases are actually very similar. The CDC recommends contact isolation for both (until scabs are gone) and airborne isolation measures for patients infected with either chickenpox or smallpox. Contact precautions include wearing gloves and a gown to enter the patient's room; removing gloves and washing hands with an antimicrobial soap prior to leaving room; dedicating noncritical care items to individual patients; and taking extra care to clean the patient environment.

Airborne precautions call for placing the patient in a private room that has monitored negative air pressure in relation to the surrounding areas; six to 12 air changes per hour; and discharge of air outdoors or monitored high-efficiency filtration of room air before the air is circulated to other areas in the hospital. Keep the room door closed and the patient in the room, the CDC advises. Health care workers immune to chickenpox need not wear respiratory protection, but the CDC is calling for workers to wear N95 respirators — typically used for tuberculosis patients — when caring for smallpox patients. ■