

Title: The Decontamination of Children – Preparedness and Response for Hospital Emergency Departments

Author: Agency for Healthcare Research and Quality (AHRQ) and Children’s Hospital Boston

Copyright: 2005

Length: 27:29

Transcript

Hello, I’m Dr. Michael Shannon, Chief of Emergency Medicine and Director of the Center for BioPreparedness at Children’s Hospital Boston. We live in uncertain times. And now, more than ever, it’s important to know what’s necessary when a chemical disaster occurs. What we’ve also learned is that, in preparing ourselves for a chemical terrorist event, we also become better prepared for chemical disasters of any type, including unintentional hazardous materials releases.

Until recently, we relied on first responders to go to the site of chemical disasters, to decontaminate patients on-site, and to transport them to hospital emergency departments in controlled fashion. What we now know is that, when a chemical disaster occurs, victims will appear at emergency department doors in uncontrolled fashion, often contaminated. It is therefore essential for hospitals, including children’s hospitals, to create protocols for the safe decontamination of children.

In recent years, there’s been considerable activity directed at emergency response, but relatively little activity directed at children and children’s hospitals. This program was therefore created for anyone who might be called upon to take care of a contaminated child who arrives at the hospital door. The program is kept intentionally brief, for you to keep as a resource for continuing education and refresher use. This program addresses circumstances in which children who are covered with toxic substances present to emergency departments for care. It will outline the steps needed in order to safely decontaminate that child - the first stage of emergency management.

We’re all busy, so it’s easy to take an issue like this and place it at the bottom of your priority list. However, there are a few important reasons that you have to think about your pediatric decontamination plan now.

First, putting a program in place is going to take time. Second, many of the concepts and principles that you’ll see are unfamiliar to some viewers. And then, finally, while a chemical terrorist incident may never occur, other chemical disasters, such as a hazardous materials release, are probably inevitable.

At the heart of this program is understanding how children differ from adults. While the central medical concepts of decontamination are the same for a victim of any age, the key differences between children and adults make the safe decontamination of children much more challenging.

They breathe more quickly, exposing them to a greater amount of airborne toxins. They have more permeable skin, exposing them to a greater amount of toxin when it lands on their skin or clothes. They have less mature immune systems, making them more susceptible to overwhelming infection from biological agents. They have less fluid

reserve, so that diarrhea and vomiting are more likely to lead to shock. Young children are non-verbal, being unable to provide a history, review of symptoms, or list of physical complaints. This increases the possibility of missing key information or important physical findings.

Children respond to unknown or fearful situations by becoming anxious and inconsolable. This further clouds the ability to assess them for injury. Young children also have no self-preservation skills, and may actually flee into harm's way. Children, particularly small children, are more challenging to handle in a decontamination environment, particularly when staff are wearing personal protective equipment. Finally, children are less able to maintain their temperature when cold, becoming hypothermic faster. This is particularly important before they are decontaminated, when they are unclothed; and immediately after, when they are wet.

Avoiding the contamination of the response personnel is key in making sure that the hospital staff can continue to do their job, taking care of as many children as possible. If you remember the sarin incident in Tokyo in 1995, contaminated children and adults appeared at emergency department doors. During that chemical disaster, because staff were not prepared, more than 100 health care workers were sickened by taking care of these contaminated children and adults.

It's therefore essential to wear personal protective equipment (PPE) and to use it properly when taking care of contaminated children. Remember that it's very difficult to communicate while wearing PPE. And programs either need to purchase special equipment or develop hand signals or some other means of non-verbal communication.

Field triage is important, and the same principles apply. But health care facilities must prepare for patients coming to their facilities. Siting the system necessary for effective pediatric decontamination, the safe removal of clothing, and thorough showering is very dependent on the layout of your facility. It can be a permanent installation or one that is erected when needed. Permanent installations are always ready and have the important components in place and readily available. However, they have a fixed size, are more difficult to scale, and require appropriate venting, such as a HEPA filtering system, so that the enclosure doesn't vent contaminated air.

A portable system only occupies its area when it's erected for use, but requires time and trained engineering staff to remove it from storage and set it up. It also requires a secure area for the storage of the necessary components and materials, convenient to the site where the system will be set up. With either type of system, you need to consider the availability of power and water, the containment of waste water, and the flow of patients into the emergency department, and how much that will disrupt normal traffic.

Every effort should be made to provide privacy during pediatric decontamination, although there typically isn't an attempt to segregate by gender, as in adult decontamination protocols. As patients move through the decontamination process, it's important to keep them separated from groups in other stages of contamination or decontamination. Three zones need to be created and maintained: a hot, a warm, and a cold zone.

While decontamination protocols are being created that call for bleach or alcohol, children should only be decontaminated with water or, if the contaminant is oily, soap and water. Any other agent can be very harmful to children's sensitive skin.

There are eight key issues in the actual decontamination process that need to be addressed, but the basic principles of emergency assessment and stabilization still apply. The ABCs: airway, breathing, circulation. Remember, though, that the assessment of children while wearing cumbersome personal protective equipment will be difficult. Removal of contaminated clothing accounts for more than 90% of the decontamination process, therefore disrobing the patient outdoors is the first important step. Keep in mind, though, that patients are crime victims, and clothing becomes evidence. Therefore all clothes should be labeled. The storage bags should be held, not discarded.

Capacity and surge issues need to be considered as well. Decontaminating two victims is quite different than decontaminating 20 or 200, and you need to consider how to keep the process efficient and how to keep children warm throughout the process. In terms of water temperature and the risk of hypothermia, the key principle is that the water temperature must be 100 degrees Fahrenheit and, when necessary, warmed blankets, wind barriers, and mobile heat sources, such as heat lamps, should be used.

A new and important consideration for children's hospitals is that, after a chemical disaster, parents are going to become patients. A distressed parent is not going to leave their child's side to go to an adult care hospital, and therefore you will be required to decontaminate adults right alongside children. But this is a good thing. Having a child who is comforted by a parent facilitates the entire process. Also, a parent is often the very best person to bring the child into the shower for the decontamination process.

Handling infants will be challenging with current technology, as chemical-resistant gloves lead to a significant compromise in dexterity. Special care must be taken, particularly when handling infants. The showering procedure needs to be carefully controlled.

A key component of any decontamination protocol is its adaptability. That protocol should be able to process 50, or even 100 children as efficiently as it does five. In order to do that, advance planning on throughput is necessary. For example, there's a general recommendation that children undergo 5 minutes of showering during decontamination. That means, for each showerhead that you have, approximately 12 children per hour can be processed. This type of advance calculation is necessary in order to make sure that your throughput and your ability to see children quickly is not compromised by large numbers.

Staff have to recognize that it takes longer to decontaminate children because the process of allaying their anxiety takes time. We all know how long it takes a three-year-old to put on their clothes, even when you say "hurry", compared to an adult. Individual children may take 10, or even 15 minutes to successfully decontaminate.

All the principles we've presented are based on existing guidelines and protocols. What we've done is assembled the experts needed to take those guidelines and modify them as they would need to be modified for a pediatric population. The material you've seen was taken from a simulated decontamination exercise. We've stuck to the basics, although

what you saw may not conform exactly to what you've seen in other resources. But that was intentional. After a chemical disaster, flexibility and adaptation are key in getting the primary job done, keeping children and personnel safe.

Now, in something resembling real time, let's take a look at the decontamination process from intake to delivery to the emergency department.

5 minute segment without narration (14:20 – 19:30)

We've provided an overview of the decontamination process itself, but now, let's talk about specific concerns you may face in terms of funding, operations, administration, and policy. If you're involved in the planning, funding, establishment, and ongoing competency maintenance of a decontamination program, you will need to focus on a number of issues. Above all, you need to make sure that your personnel are kept safe, and you need to let them know that they are safe if they follow the protocols you've established.

Your planning will provide effective decontamination for children. But it's also been designed to assure the safety of all response personnel. A pediatric decontamination program should be supported by a number of local, state, and federal programs, such as your local board of health, fire department, and emergency management agencies. A good umbrella federal source is FEMA. But also feel free to use the information at the end of this program to contact us at the Center for BioPreparedness.

The siting of the decontamination showering system at your facility should take into consideration not only its proximity to the emergency department - for swift and efficient transfer of the decontaminated patients - but also how the system protocol will minimize its interference with other emergency department activities, such as ambulance arrivals, admissions, and the care of other patients.

Areas that already provide partial shelter from the weather will help simplify the process of siting, designing, and erecting a decontamination system. Permanent installations are difficult to scale to the need, so the system throughput is generally fixed by the number of ambulatory and nonambulatory showerheads. Erected systems can be scaled more easily because the equipment needed for more than one bay of showerheads can be staged in the storage area and, space permitting, deployed if the number of patients requires. Use the rule of thumb of 12 patients per showerhead per hour when gauging the scale of the system planned. In either type of system, the tracking plan needs to be able to accommodate a potentially large number of patients from initial intake through decontamination and handling in the emergency department.

Budgeting for the whole program requires an assessment of cost in the start-up phase for portable or fixed decontamination showers and personal protective equipment, for stockpiling necessary supplies and materials, and for ongoing maintenance and training. A thorough cost tracking system should be in place to allow for reimbursement through existing local, state, and federal programs.

Different classes of PPE offer different levels of isolation for staff, but also become more complex to stock, train, and don. Level C PPE provides a base level of protection that will allow staff to respond to most chemical events with a high degree of confidence that they will always be safe. All systems need to be tested through regular drills so that all

the components are reliable and can be put in use efficiently. Particularly for systems that are erected when needed, this involves drilling not only the staff on the decontamination process, but also the engineering and facility staff needed to take the system and components out of storage, erect it, and make it operational.

Ongoing training is essential to maintain the necessary skill set among a group large enough so that 24/7 coverage is available. It is also important to consider the emergency department transition resources and resource needs within, since decontaminated patients will likely proceed right into the emergency department. If a large-scale incident occurs, the decontamination process will be bringing a significant number of patients into the emergency department at a rate equal to the number of showerheads in your system. Anticipate the need to mobilize additional staff and hospital supplies.

The decontamination program also requires an effective patient tracking system, as these patients will enter the emergency department at a rate that makes traditional intake processes impossible. Also, patient tracking is difficult in children because they are non-verbal. Alternate tracking means, such as photos, should therefore be considered.

Recent legislation has designated hospital emergency departments as first responders, for the first time, making them available for funding and other resources that were previously only available to police, fire, and EMS.

There are many resources available to you to assist in this process, including the resources here at the Center for BioPreparedness at Children's Hospital Boston. What's most important, though, is to begin this process of creating decontamination protocols for your hospital so that they're in place when you need them.

The Decontamination of Children

Decontamination of Children. October 2005. Agency for Healthcare Research and Quality, Rockville, MD. www.ahrq.gov/research/decontam.htm

For inquiries regarding this video, please contact:

Center for Biopreparedness, Children's Hospital Boston

www.childrenshospital.org/clinicalservices/Site1851/mainpageS1851P0.html

Children's Hospital Boston

300 Longwood Avenue

617-355-6637

Agency for Healthcare Research and Quality (AHRQ)

www.ahrq.gov

www.ahrq.gov/research/decontam.htm

To order a free single copy of the video on DVD or VHS, please contact:

AHRQ Clearinghouse 1-800-358-9295

ahrqpubs@ahrq.gov

Specify Product No. 05-0036-DVD to order the DVD

Specify Product No. 05-0036-VD to order the VHS video.