

# PEDIATRICS

## Introduction

Pediatric patients are an at-risk population that hospital emergency managers must consider during planning for disasters and public health emergencies. Nearly 22 percent of the U.S. population is under 18 years of age and about one-third of children are younger than six.<sup>1</sup> Medical and emergency management equipment, training, and processes; social support; supervision; and legal and ethical issues are all challenges hospitals need to address when planning for pediatric patients. The age definitions for pediatric patients vary, but legal obligations generally exist until 18 years of age with few exceptions (e.g., emancipated minors). It should be noted, however, that equipment requirements differ for patients younger than eight years old.

Children are considered an at-risk population for both legal and practical reasons. The treatment of ill and injured children can be complicated by size and other physical factors, emotional factors, communication ability, ability to understand treatment, and other issues that are beyond the scope of this chapter. This chapter assumes the hospital is a *non*-children's hospital, as a dedicated children's hospital would have significantly different planning considerations and regional obligations compared to a community hospital. The chapter also assumes the hospital provides or can provide some general pediatric inpatient services. While some chapter content may not apply to hospitals that do not provide these services, during periods of high capacity or when there is difficulty transferring patients (e.g., due to weather or roadway damage), all hospitals must be prepared to provide ongoing/inpatient pediatric care, particularly to older children without complex medical histories who do not require pediatric-sized equipment or other specialized supplies. This chapter is designed to be an introduction to key pediatric issues for hospital emergency management, not a definitive resource, and does not address the specifics of pediatric critical and trauma care (e.g., differences in anatomy, shock compensation, imaging approaches).<sup>2</sup>

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### Related Resources

Additional resources are available in ASPR TRACIE's [Pediatric/Children](#) Topic Collection.

<sup>1</sup> Federal Interagency Forum on Child and Family Statistics. (2024). [America's Children: Special Issue 2024, Maternal and Infant Health and Well-being.](#)

<sup>2</sup> The [Minnesota Pediatric Surge Toolkit](#) includes a [primer](#) and various tools and templates that may be helpful when developing a comprehensive plan.

Regardless of the size of the facility and the services provided, the emergency manager should consider integrating pediatric considerations into the Emergency Operations Plan or may elect to have a pediatric-specific annex. In either case, the emergency manager should identify a pediatric subject matter expert (SME) within the facility who can serve on the Emergency Management Committee and assist with pediatric planning and training. This SME could be any type of health care provider with expertise and motivation.

External SMEs—including one from the pediatric specialty center that is the usual referral destination for the hospital—should also be engaged during the planning process to review the plans and provide input. In addition, hospital staff should understand the regional pediatric resources, be aware of any health care coalition/regional pediatric mass casualty incident (MCI)/surge plans, and know how their facility fits in with those plans relative to receiving initial casualties and accommodating overflow of pediatric patients. Regardless of the hospital designation, it may receive emergency pediatric patients by emergency medical services (EMS) or self-referral.

The hospital's Hazard Vulnerability Analysis should consider pediatric scenarios carefully alongside a realistic assessment of facility preparedness. The presence of schools, day care centers, summer camps, recreation centers, and locations for large mass gatherings in close proximity to the hospital and the presence of other hospitals in the area affect the potential impact of a pediatric incident on the hospital and the larger community.

## ICS Considerations

At the Incident Command level, incidents involving pediatric patients should prompt consideration of the following issues:

- **Notifications:** Incidents involving pediatric patients may require the notification of specialty providers in addition to those usually notified in an MCI. Paging groups or other methods of ensuring those with pediatric expertise are notified should be available and triggered based on thresholds and existing capacity versus the expected demand.
- **Access controls:** Early implementation of access controls both in and out of the facility may support pediatric patient safety.
- **Telecommunications:** If the incident occurs at a school or other location with a large number of children, phone lines are likely to be overwhelmed by concerned parents and loved ones. Plan to provide alternative modes of communication (e.g., local school or news social media channels).
- **Media relations:** Media interest will be higher in an incident involving children; hospital plans should ensure media is staged away from patients and their loved ones to preserve privacy.
- **Government representatives:** As notifications and media reports escalate to senior government officials, they will respond to the hospital to show their support. Plans should include an approach for streamlining their arrival and staging areas.

- **Traffic controls:** The hospital should expect a higher volume of vehicles as parents/loved ones arrive. Working with onsite public safety or other hospital staff who can screen/redirect traffic can help.
- **Liaison:** If a bus company, school, camp, or day care is involved, rapid liaison with a representative from that entity should be established to determine the location of each child, collect parent/guardian contact information, and share reunification information and location(s).
- **Pediatric-specific ICS positions:** The hospital ICS should have positions and job aids for a pediatric technical specialist (clinician), pediatric reunification leader (who typically sets up a pediatric safe area), and pediatric emergency department and inpatient supervisors, also referred to as Medical Care Branch Directors.

## Pediatric Safe Area and Reunification

Resources are available to help hospitals plan for the safety of children awaiting reunification with their parents or guardians.<sup>3</sup> One component of this planning is designation of a Pediatric Safe Area (PSA) in the facility with staff and detailed processes to ensure the safety of two groups of children:

1. Uninjured children arriving with parents or guardians who are not capable of caring for them.
2. Children with minor injuries who have been treated and are ready for discharge but have no available parent or guardian.

In some cases, temporary care for children of staff members arriving in response to an MCI alert may be established in a different location.

In small-scale incidents, a staff person can monitor one or more children in the care area until they are reunited with family. As the incident scope grows, a different site should be used, such as a physical therapy area, conference room, or playroom. A plan for the PSA should specify staffing in a controlled access, child-friendly (or at least safe) area with designated supplies including sign-in sheets, phone, nametags/wristbands, toys/games, and necessary safety equipment (e.g., outlet plug covers). Age-appropriate snacks and water/juice/formula should be available from nutrition services. The hospital emergency manager should be familiar with any state laws that govern childcare and how these temporary services are governed (if at all). In some cases, ratios are specified for staff to children based on age. Background checks and other

### From the Field

One state suggests a common approach to using wristbands on pediatric patients during triage. The patient wristband stays on if the child was evaluated/treated and a color-coded wristband is added to indicate:

- Purple – Parent is a patient who cannot care for the child currently
- White – Without parent/guardian accompanying

<sup>3</sup> An example of such a resource is [Family Reunification Following Disasters: A Planning Tool for Health Care Facilities](#).

documentation will be needed ahead of time for those providing childcare. The facility and staff should also clearly understand their state legal obligations to children, including the ability to place holds and restrict movement if necessary.

#### Related Resources

Additional resources are available in ASPR TRACIE's [Family Reunification and Support](#) Topic Collection.

The process for reunification of the child with a parent/guardian should be specified. This includes how the parents/guardians are vetted and the threshold for release (e.g., picture identification corresponding to name/address, family photos, child recognizes and verbalizes parent/guardian, calling each other on phones). The process should also describe the interaction between the Family Support Center (FSC) and the PSA (e.g., will PSA staff bring the child to another location to be reunited with their parents/guardians?). Ideally, a social worker should be available to work through any issues that emerge during the reunification process. The plan should also have options for when the child's caregiver cannot be reached or identified. Additional information may be found in the [Family Support](#) chapter of the Guidebook.

## Mental Health

Caring for the mental health of a child exposed to a disaster is a special challenge for any part of the health care system. The exposure can have lifelong impacts, identifying a mental health challenge is not always easy, and the behavioral health clinical resources for children are sparse in most communities. A stepwise framework in this space is key.

Prevention should be integrated throughout systems, and at a minimum should include trauma-informed care principles that take care not to expose children to further trauma from the health care entities charged with caring for them. Initial interventions include basic support and communication, ensuring physical safety, providing an efficient family reunification process, and tools such as psychological first aid. The next step is identifying which children have been exposed to the greatest risk factors and prioritizing them for evaluation and clinical intervention as needed. Parents and guardians should understand manifestations of stress in children and how to support incident processing in an age-appropriate way. Screening tools are the next layer of care, allowing health care providers to identify manifestations of acute stress disorders or post-traumatic stress disorder. Finally, clinical intervention (e.g., tailored referrals and follow-up plans) may be needed weeks or months following the incident for the children deemed at highest risk for problems.

Planning to address the needs of the pediatric patient requires significant adjustments to usual support processes and the hospital emergency manager and team should engage SMEs prior, during, and after the incident to ensure effective support.



## Decontamination

Children can be at higher risk for hazardous materials exposures and toxicity due to their curiosity, inability to understand risk, higher surface to body weight ratio, and height (specifically, the potential to receive higher levels of exposure to vapors that are heavier than air compared to taller adults).

Providers in protective equipment can be frightening and difficult to understand. Equipment for adult decontamination is often not child-appropriate, as showerheads are too high and re-dress kits do not fit. Hospitals should prepare for pediatric decontamination including making sure that appropriately sized equipment and gowns are available, baby shampoo is used for cleansing, and, if showering is indicated, children are escorted through the process by their parent/guardian if possible and a decontamination team member if not.

### Related Resources

More information on decontamination of children may be found in ASPR TRACIE's [Hospital Patient Decontamination](#) Topic Collection.

The emphasis with children should generally be on dry decontamination with clothing removal, body wipes for intact exposed skin, and adding gentle hair washing into a basin at the bedside if needed. In many cases, clothing removal alone will suffice. Obtaining adequate patient cooperation for showering with younger patients can be difficult. Children become hypothermic much easier than adults and this should be considered when choosing a decontamination strategy. Low pressure showers with warm water should be used to avoid hypothermia. Finally, slip and trip hazards should be considered as potential risks. Parents should not be allowed to carry children in the decontamination area for this reason. Additional details can also be found in the [Chemical Hazardous Material Decontamination](#) chapter of the Guidebook.

## Evacuation

Hospital evacuation plans (refer to the [Sheltering, Relocation, and Evacuation](#) chapter of the Guidebook for additional information) should have a section dedicated to pediatric patients. The main concern during evacuation is accountability; children should be tracked carefully through the process and never be left unsupervised. Depending on their age, they may not be able to communicate effectively with care providers, emphasizing the need for a parent/guardian or staff member to accompany them if possible. Children may be traumatized by the incident, then further by the sheltering, relocation, and/or evacuation process. Close attention to their needs during this time, shielding them from traumatizing imagery, and reducing environmental stressors to the degree possible can help reduce current and future impacts.

## Special Pathogen

An ill child potentially infected with a special pathogen poses specific challenges for the hospital. In addition to the considerations in the [Biological Incidents](#) chapter of this Guidebook,



the hospital should ensure the following pediatric-specific special pathogen policies are included in plans:

- Parent/guardian is accessible to the child, ideally in the room in appropriate personal protective equipment (PPE) but also consider means of ongoing electronic access via screens/tablet.
- Pediatric-trained staff are comfortable with special pathogen PPE and patient care procedures.
- Procedures are documented and practiced to reduce exposure risk should a patient be uncooperative with sample collection, particularly blood sampling from a possible viral hemorrhagic fever patient.

## Mass Casualty

There are multiple issues that complicate MCI response when children are involved, not the least of which are enhanced provider, patient, and parent stressors and trauma that can limit problem-solving ability and enhance the chance of patient care errors.

Some of the key domains that must be accounted for when planning for pediatric mass casualties are:

1. **General:** Cohorting pediatric patients in one or a few areas may help accountability and supervision. Providing a companion as staffing allows should be emphasized to monitor and comfort the child. Comfort measures—including relief of pain and anxiety and reduction of environmental stressors—should be a focus throughout the patient’s stay. Children should be kept separate from unrelated patients and visitors.
2. **Equipment:** Without the correctly sized monitoring equipment (e.g., oximeter probes, blood pressure cuffs), airway equipment (e.g., endotracheal tubes, oxygen masks), intravenous and intraosseous access needles, pediatric-capable ventilators, surgical equipment, and chest tubes on hand, pediatric patients may die. Some facilities use height or weight-based color-coded systems for resuscitation though usually only a cart or two are configured to the system. Additional equipment should be available and clearly labeled. Guidelines exist for a [basic set of pediatric equipment for emergency departments](#), though the quantities do not account for mass casualties. Other publications incorporate specific planning for pediatric MCIs.<sup>4</sup>
3. **Medications:** Though most medications given during disasters are not pediatric-specific, their method of administration (e.g., nasal

### Related Resources

The Disaster Available Supplies in Hospitals ([DASH](#)) Tool can be used to estimate adequate supplies on hand – including pediatric sizes and specific medication needs – with upward adjustments to those numbers made based on local hazards and the hospital’s role in the community. The DASH Tool is also a good starting point for planning pharmacy par levels.

<sup>4</sup> Emergency Medical Services for Children. (2024). [Checklist of Essential Pediatric Considerations for Every Hospital’s Disaster Policies](#).

atomizer) or preparation (e.g., elixirs of analgesics or antibiotics) for pediatric patients may require additional supplies or stocking. Whenever possible, a clinical pharmacist should be present in the resuscitation area to help prepare and check doses of critical care medications. Medication errors are likely to be more common in disaster situations, emphasizing the need for providers to double-check doses.

4. **Staffing:** Depending on the hospital, staff with pediatric training may be called to the ED to assist with vascular access and resuscitation. Nursery, pediatric inpatient, venipuncture/IV teams, and surgical and anesthesia staff (not occupied with operative cases) may be needed to help with non-traditional roles.
5. **Space:** The plan should direct the sickest/smallest victims to the most pediatric-dedicated ED locations with the others cohorted in appropriate areas of the ED to the degree possible. Walking wounded patients may be assessed on arrival and directed to a secure waiting or minor care area. Ideally, younger children should be prioritized for these areas.
6. **Training:** Basic training in pediatric trauma and critical care principles for nursing and provider staff should be drilled through simulations whenever possible, refreshed regularly, and supplemented by printed, posted materials. In addition, staff should be trained on emergency procedures relevant to pediatrics such as location of equipment and surge plans.
7. **Tracking:** A wristband indicating the patient is younger than 18 should be applied as soon as possible. Registration into the electronic health record should be expedited. If the child has a parent/guardian at the facility, this should be indicated in the record (as well as potentially via an additional colored wristband) and this person should be located and notified as soon as possible.

#### From the Field

A trauma center has small bins with initial management supplies for pediatric patients ages 1-8 (e.g., a range of disposable laryngoscope blades, endotracheal tubes, IV catheters, bag-valve mask with different sizes) to ensure rapid control of hemorrhage, establish and immobilize IV lines, and establish airways. These bins ensure that if critical care expands beyond the resuscitation area basic supplies are immediately available for each pediatric patient.

## Inpatient Care

Using the conventional, contingency, and crisis surge capacity framework (described in the [Surge Concepts](#) chapter of the Guidebook), a staged expansion for pediatric care should be carried out that concentrates the youngest and most complicated patients in the pediatric care units, expanding pediatric care onto other units. This expansion should consider the ability to secure access to the area and effectively monitor pediatric patients.

Staff privileging should be reviewed to ensure that nursing staff on adult units are allowed to care for minors. Just-in-time training may be required in some cases. When young pediatric patients are cared for in non-pediatric units or when staffing requires crisis adaptations, a



tiered staffing model ensures pediatric nursing and physician staff (or physician staff in teleconsultation with pediatric experts) rounds on children each day and supports the reassigned nurses providing the bedside care. Staff with the highest level of pediatric experience and training should care for the youngest and sickest patients.

Policies may also need to be waived during surge situations, and this should be understood prior to an incident. In many cases, thresholds for admission to the Pediatric ICU are more liberal than for adult units (e.g., any patient requiring oxygen saturation monitoring, medications, neuro checks, or labs more frequently than every four hours) and these criteria should be adjusted to the situation. The Pediatric Technical Expert/on-call consultant should understand their role working with the unit charge nurses and Hospital Nursing Supervisor/Inpatient Branch Director to optimize patient placement according to needs.

Adequate pediatric equipment should be available for inpatient care. All hospitals should consider having additional cribs in storage in case they are needed as standard adult beds pose an entrapment and injury risk to children. Appropriate monitors and equipment (e.g., appropriately sized blood pressure cuffs, central/arterial lines, oxygen saturation monitors) cannot be substituted for and are often difficult to obtain during a surge situation.

## Transfers and Consultation

Most hospitals do not provide pediatric subspecialty care, making virtual mechanisms of consultation necessary to provide ongoing care in situations where transfer is not possible or will be delayed. These mechanisms may need to be rapidly expanded during a surge of patients. In some cases, bringing in specialty staff may be an option. This could occur when transfer of a large number of patients at once is not possible and onsite support and assistance with prioritization is desired (e.g., a major burn incident in a small community) or in a metropolitan area where specialist staff from another hospital could round on patients when transfer is not an option.

The transferring hospital should be familiar with available pediatric-capable transport resources. Pediatric critical care (particularly ground-based) units are in short supply and often not available in smaller communities. Aeromedical programs offer options but may require planning beyond usual service providers. The hospital should plan for situations in which multiple helicopters are required and plan with EMS for nearby alternate landing zones and communications plans (e.g., designating a single person to coordinate incoming helicopters on a common radio talk group). In some cases, sending facility nursing and/or respiratory therapy staff in an ambulance may be the timeliest way of accomplishing safe transfer as long as this can be done without depleting hospital resources. Car seats or other restraint devices may be needed for safe transport. The hospital should understand whether EMS has these or will need them and whether they are comfortable installing them in the ambulance.

In an MCI, the Pediatric Technical Specialist or designee should be responsible for determining the priority for transfer and safe transfer mode so there is an orderly flow of patients to

available ground and aeromedical units. In some cases, a regional Medical Operations Coordination Center or the area receiving hospital can assist with prioritization and arranging transfers. Tracking the patient, transport unit, destination, and time of departure are crucial.

## Conclusion

All hospitals should be prepared to care for pediatric patients following a disaster or emergency. Those located near significant child populations (e.g., a school or summer camp) or in areas without many other health care resources should factor in the potential need to care for a large number of pediatric patients with a wide range of injuries. Pediatric patients have unique physical and social needs that must be considered in planning, including the availability of appropriately sized medical equipment for the youngest patients and the importance of quickly reuniting children with their parents or guardians. Coordinated, collaborative planning with community partners can help hospital emergency managers ensure the best care for the youngest patients after a disaster.

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