

ASPR TRACIE Technical Assistance

Request Receipt Date (by ASPR TRACIE): 28 March 2017

Response Date: 4 April 2017, Updated 12 June 2020

Type of TA Request: Standard

Request:

The requester asked for technical assistance in searching for pediatric patient movement resources, including lessons learned, after action reports (AARs), and prehospital literature focused on neonatal and pediatric medical transportation.

Response:

The ASPR TRACIE team reviewed existing Topic Collections for materials on pediatric patient movement and prehospital literature focused on pediatric medical transportation; namely, the [Pediatric, Patient Movement and Tracking, Pre-hospital](#), and [Healthcare Facility Evacuation / Sheltering](#) Topic Collections. We also searched for any additional resources online.

Unfortunately, we could not identify any AARs specifically related to pediatric patient movement or prehospital medical transportation. However, other materials gathered are provided in the following sections of this document. Section I includes lessons learned materials. Section II provides multiple prehospital resources focused on pediatric medical transportation. Finally, Section III includes other pediatric patient movement resources related to evacuation and interfacility transfer.

I. Lessons Learned

ASPR TRACIE. (2015). The Disaster-Related Evacuation of Neonatal and Pediatric Intensive Care Units: An ASPR TRACIE Response to a Request for Technical Assistance. (See attachment).

This document describes the literature review methodology and analysis of the NICU and PICU evacuation information collected by ASPR TRACIE staff. ASPR TRACIE staff categorized information chronologically and by disaster type, and then placed it in tables. The team also included the results of a 2012 literature search on evacuation in Appendix A.

Baldwin, S., Robinson, A., Barlow, P., and Fargason, C.A. (2006). [Moving Hospitalized Children All Over the Southeast: Interstate Transfer of Pediatric Patients During Hurricane Katrina](#). *Pediatrics* 117: s416-420.

The authors of this article discuss the events after Hurricane Katrina and lessons learned with regards to providing continued pediatric care delivery during the disaster. Issues

such as pediatric patient movement, and communication and logistical challenges are addressed.

Barkemeyer, B. (2006). [Practicing Neonatology in a Blackout: The University Hospital NICU in the Midst of Hurricane Katrina: Caring for Children Without Power or Water.](#) Pediatrics. 117(Suppl. 4):S369 -S374.

The author recounts the challenges associated with providing care in a university hospital's neonatal intensive care unit before, during, and after Hurricane Katrina made landfall.

Berkman, L. (1994). [Earthquake: Disaster Before Dawn: Marines Evacuate 5 Infants from Northridge Ward: Rescue: Two El Toro Base Helicopters are used to fly the Babies from Quake-damaged Unit to Local Hospitals.](#) Los Angeles Times.

The author of this article discusses the evacuation of five infants via Marine helicopters from Northridge Hospital Medical Center to Orange County (CA) after an earthquake caused damage to a neonatal ward.

Espiritu, M. (n.d.). [The Vertical Evacuation of a Neonatal ICU During a Disaster: Lessons Learned at NYULMC During Hurricane Sandy.](#) (Accessed 6/12/20)

This presentation focuses on lessons learned from the evacuation of the neonatal intensive care unit (NICU) of NYU Langone Medical Center during Superstorm Sandy in 2012. It also includes lessons learned from Tropical Storm Irene in 2011. Pediatric patient transport is addressed in the presentation.

Ginsberg, H.G. (2006). [Sweating it out in a Level III Regional NICU: Disaster Preparation and Lessons Learned at the Ochsner Foundation Hospital.](#) Pediatrics 117: s375-380.

The author of this article highlights the challenges and lessons learned associated with evacuating neonates from the New Orleans hospital after Hurricane Katrina.

Orlando, S., Bernard, M.L., and Mathews, P. (2008). [Neonatal Nursing Care Issues Following a Natural Disaster: Lessons Learned from the Katrina Experience.](#) (Abstract only.) The Journal of Perinatal and Neonatal Nursing. 22(2): 147-53.

The authors of this article address nursing care issues and lessons learned from the events that unfolded in the New Orleans area neonatal units during and after Hurricane Katrina. They highlight the importance of the ability to maintain communication and facilitate transportation of neonates out of a disaster area. They also provide guidance in support of disaster education for neonatal nurses.

Shultz, C., K. Koenig, and R. Lewis. (2003). [Implications of Hospital Evacuation after the Northridge, California, Earthquake.](#) The New England Journal of Medicine 348: 1349-1355.

The authors of this article discuss their study of all acute care hospitals in Los Angeles County, CA, that reported the evacuation of at least one inpatient due to damage from the Northridge earthquake. Two of these institutions evacuated some of their pediatric patients to a children's hospital 20 miles away, in an area thought to be outside the earthquake zone. Some of the children initially transferred to this hospital were reevacuated when it was condemned 14 days later. Based on their findings, the authors provide suggestions for triage strategies, evacuation strategies, and emergency plan development.

II. Pre-hospital/ Medical Transportation Resources

Abraham, H. (2014). [Planning for Pediatrics in Disasters](#). Journal of Emergency Medical Services.

The author encourages emergency medical planners to account for children's' unique physical, psychological, and communication needs when drafting pre-hospital emergency response plans. She also shares pediatric-specific care tips for decontamination, triage, airway procedures, drug dosage and delivery, and psychological care.

Anderson, M., Amparo, A., Kaplowitz, L., et al. (2015). [Near-Term Strategies to Improve Pediatric Surge Capacity During Infectious Disease Outbreaks](#). U.S. Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response.

This report summarizes the methods, limitations, gaps, key findings, and results of the National Advisory Committee on Children and Disasters Surge Capacity Work Group's assessment of current national pediatric surge capacity. The assessment focused on: **the current state of readiness to transport large numbers of critically ill children**; the current state of general emergency/ pediatric emergency surge capacity; the current readiness of children's hospitals to surge during an infectious disease outbreak; and the current state of non-pediatric facilities to care for children in large-scale disease outbreaks. The report also includes a summary of potential mitigation strategies for identified gaps, a review of best practices, and a summary of practical tools that can help healthcare coalitions improve community readiness to care for children.

Central Valley, CA. (2012). [Regional Pediatric Disaster Surge Framework](#). California Hospital Association.

This document provides a framework for community collaboration to develop regional, comprehensive, integrated pediatric preparedness response plans. The transition to Standardized Emergency Management System (SEMS) is addressed beginning on page 12, followed by a section on pediatric transports and transfers on page 14.

Children's National Health System. (2015). [Pediatric Emergency Quick Reference Guide](#).

This free reference guide for Android or iOS was developed by physicians in the Children's National Health System Division of Emergency and Transport Medicine, and

provides a quick reference for the vitals, equipment, and dosage guidelines for an emergency pediatric patient.

Foltin, G., Tunik, M., Cooper, A., Treiber, M., et al. (2008). [Pediatric Disaster Preparedness: A Resource for Planning, Management and Provision of Out-of-Hospital Emergency Care](#). Center for Pediatric Emergency Medicine.

This document focuses on key elements of pediatric pre-hospital emergency care for Emergency Medical Services (EMS) system planning for disasters and terrorism. It is targeted to EMS agency medical directors and administrators, emergency managers, and any other key stakeholders concerned with the functions and activities of the EMS system during an emergency or disaster.

Loma Linda University Children's Hospital. (2013). [Pediatric/Neonatal Disaster Reference Guide: Bridging the Gap Between EMS and Hospital Care](#).

This guide was created to help emergency managers, coordinators, and hospital staff in their efforts to develop their own specific departmental emergency operations plan that addresses the special needs of children and infants. It also addresses working on bridging the gap between EMS and hospitals.

Los Angeles County Emergency Medical Services Agency. (2012). [Pediatric Surge Quick Reference Guide](#). California Hospital Association.

This document, developed by the Los Angeles County Emergency Medical Services Agency, contains summaries of critical information for managing the care of children during emergencies or disasters, including vital signs; risks during disasters; signs of respiratory distress; equipment sizes; and fluid resuscitation.

Los Angeles County Emergency Medical Services Agency. (2013). [Los Angeles County Pediatric Surge Plan](#). California Hospital Association.

This plan provides details on how each hospital within Los Angeles County would support a pediatric surge of patients including surge targets, supplies, and patient type. This plan also includes parameters for transporting children from prehospital field operations to healthcare facilities and transferring of patients among hospitals.

Sinz, B., Westlake, D., Tharratt, R.S., et al. (2010). [EMSC \(Emergency Medical Services for Children\) Pediatric Disaster Preparedness Guidelines: LEMSAs \(Local Emergency Medical Services Agencies\)](#). California Emergency Medical Services Authority.

This guide (which is in the process of being updated) was created for emergency medical service providers in California, and shares child-centric approaches related to triage, treatment, and decontamination. It includes detailed guides and checklists on topics such as medications, mental health concerns, considerations for children with special needs, and disaster drills.

Steve, S., Rebecca, L., Rhonda, D., et al. (2007). [Prehospital Preparedness for Pediatric Mass-Casualty Events](#). (Abstract only.) Pediatrics. 120(4).

The authors examined the preparedness levels of U.S. emergency medical services agencies specific to the care of children who are involved in mass-casualty events. Less than 15% reported pediatric-specific mass casualty plans, and while almost 70% reported participating in local disaster drills within the past year, fewer than half of those drills included pediatric victims.

U.S. Department of Health and Human Services, Administration for Children and Families, Office of Human Services Emergency Preparedness and Response. (2010). [National Commission on Children and Disasters: 2010 Report to the President and Congress](#).

This report includes the findings and recommendations from the Commission's examination and assessment of the preparedness, response, and recovery needs of children from all hazards. It includes 32 recommendations in areas such as disaster management, mental health, **emergency medical services and pediatric transport**, sheltering, and evacuation. Appendix B of the report includes an index organized by the agency, group, or individual charged with implementing the recommendations.

Various Authors. (2009). [Pediatric Surge Pocket Guide](#). California Hospital Association.

This pocket guide contains clinical checklists, guides, and just-in-time references to manage a surge of pediatric patients. It includes the following sections: Normal Values; Triage and Assessment; Treatment and Medications; Equipment; Decontamination; Mental Health; and Pediatric Safe Areas. **NOTE:** This document may be outside the scope of the request; however, we thought it could be a useful resource since it addresses field mass casualty.

III. Other Pediatric Patient Movement Resources (related to Evacuation or Interfacility Transfer)

Carbine, D., Cohen, R., Hopper, A., et al. (2015). [Neonatal Disaster Preparedness Toolkit](#). California Association of Neonatologists.

This toolkit identifies major hazards faced by neonatal intensive care units in California and provides suggested mitigation and response planning strategies, including evacuation and sheltering in place, and patient transport. It also provides appendices with sample check lists, job action sheets, and information transfer sheets for specific hazards.

Emergency Medical Services Authority, California Health and Human Services Agency. (2015). [Guidelines for Pediatric Interfacility Transport Program](#).

The purpose of this document is to provide uniform guidelines within the State of California for pediatric interfacility transport programs to assure quality of care, cost efficiency, coordination of transports, and adherence to state and federal regulations.

Emergency Nurse Association, Emergency Medical Services for Children, and Society of Trauma Nurses. (n.d.). [Inter Facility Transfer Toolkit for the Pediatric Patient](#). (Accessed 6/12/20)

This toolkit can help in the development of pediatric transfer guidelines to assist staff as they work to ensure safe and timely interfacility transfer of pediatric patients. The resources contained within the document include best practices of hospitals from around the country.

Femino, M., Young, S., and Smith, V. (2013). [Hospital-Based Emergency Preparedness: Evacuation of the Neonatal Intensive Care Unit-The Smallest and Most Vulnerable Population](#). (Abstract only.) *Pediatric Emergency Care*. 29(1):107-13.

The authors describe a full-scale neonatal intensive care unit evacuation exercise and emphasize the importance of constant, clear communication.

Illinois Emergency Medical Services for Children. (2009). [Neonatal Intensive Care Unit \(NICU\) Evacuation Guidelines](#).

These neonatal intensive care unit (NICU) evacuation guidelines were developed by professionals throughout Illinois. A multi-disciplinary committee was also convened to collate personal experiences, recommendations, and current literature on NICU evacuations. This guide is intended to assist healthcare providers assess pre-event vulnerabilities and plan for the evacuation of medically fragile Level III NICU patients while addressing core components of incident management, in conjunction with the promotion of patient safety and evacuation procedures based on lessons learned from past disasters and experiences.

Lowe, C.G. (2009). [Pediatric and Neonatal Interfacility Transport Medicine After Mass Casualty Incidents](#). (Abstract only.) *The Journal of Trauma*. 67(2 Suppl): S168-71.

A mass casualty incident can present major challenges for a critical care transport team, which is essential for the safe interfacility movement of critically ill patients. The author reviews the capabilities and limitations of pediatric and neonatal critical care transport teams and factors that hindered the evacuation of pediatric and neonatal patients after Hurricane Katrina to provide recommendations to improve the efficiency and efficacy of interfacility transport of pediatric patients.

Lucile Packard Children's Hospital. (n.d.). [Preplanning Disaster Triage for Pediatric Hospitals: TRAIN TOOLKIT](#). (Accessed 6/12/20)

The Triage by Resource Allocation for IN-patient (TRAIN) matrix is a tool for pediatric hospital disaster “pre-planning” and an in-patient triage system designed to facilitate evacuation in a major crisis. It categorizes pediatric inpatients according to their resource transportation needs. It can be implemented manually or within an electronic medical record.

Texas Trauma Service Area (TSA) B. (2016). [Trauma Service Area - B \(BRAC\): Regional Pediatric Plan.](#)

This plan provides prehospital and hospital providers with regional standardized procedures for the treatment of pediatric patients. It addresses various issues to include: prehospital triage, helicopter activation, inter-hospital transfers, pediatric trauma triage/transfer decision scheme, among others topics.