TRANSPORT OF THE CRITICALLY ILL CHILD

INTRODUCTION

Pediatric inter-facility transport first began in the 1970s when a two-fold difference in mortality was first demonstrated between neonates cared for solely at a community hospital versus those transferred to a regional center. Today as medicine continues to make technological strides and therapeutic advances, community hospitals often find themselves ill equipped to provide acute care to ill and injured children. The growing trend toward centralized pediatric services further necessitates the transfer of children requiring subspecialty care to a regional facility. From these forces has come the advent of the pediatric critical care transport service. Like their neonatal counterparts, pediatric critical care transport teams are overseen in large part by pediatric intensivists or emergency medicine physicians. However, increasing demand for transport of non-critically ill children, increasing presence of pediatric hospitalists, and increasing time constraints felt by pediatric intensivists is shifting the paradigm. Co-direction of pediatric critical care transport services by intensivists and hospitalists is becoming more common. Transport systems vary from institution to institution, some having a dedicated in-house pediatric critical care transport teams and others utilizing outside transport services. For transported patients, pediatric hospitalists may serve as referring or accepting attending physician, transport physician, or transport coordinator. Through each of these roles pediatric hospitalists fulfill an essential function in ensuring the safe and timely transport of ill children.

KNOWLEDGE

Pediatric hospitalists should be able to:

- Compare and contrast advantages and disadvantages between transport modalities including non-medical, Basic Life Support (BLS) ambulance, Advanced Life Support (ALS) ambulance, Critical Care Team (CCT) ambulance, and specialized Neonatal/Pediatric Critical Care Transport service (Table 1).
- Discuss the role of the transport coordinator in effectively triaging to the proper facility, engaging subspecialty services, and determining safest modality of transport.
- List the critical history and physical examination elements necessary (to give or obtain) to ensure a safe, effective, expeditious transport, attending to verbal, written, and electronic formats.
- Explain how the selection of mode of transportation and team composition are influenced by patients' clinical status and transport logistics such as local traffic conditions, geographical distance, weather, and resources (internal and external) available at the time of the transport.
- Describe the role of subspecialist and intensivist consultation in stabilization and management during transport and upon arrival to the destination facility.
- Describe the knowledge base and skill set of non-physician transport team members.
- Review the use of standardized procedures on transport, including how they are used by non-physician team members and the process for creation, approval, and oversight.
- Discuss basic altitude physiology and describe how clinical conditions such as hypoxia can be impacted by changes in altitude.
- Summarize the transport process, including communications, documentation, and team member roles attending to local context.
- Discuss the role of the transport program in the local community, including services provided and outreach education.

SKILLS

Pediatric hospitalists should be able to:*
(**As appropriate for pediatric hospitalists' role as referring or accepting attending physician, transport physician, or transport coordinator.)*

- Efficiently obtain or give critical clinical information placing particular emphasis on cardiac, pulmonary, and neurologic disease that could impact the transport process.
- Provide recommendations regarding laboratory studies and imaging, as well as therapeutic options for referring facilities and physicians.
- Effectively prepare the team to anticipate possible complications during any point in the transport, communicating all available clinical information and creating action plans for potential complications prior to transport.
- Manage care during transport at a level and quality of care equivalent to that offered in the acute care hospital setting, limited only by medications and services not available during transport.

- Demonstrate strong clinical abilities and expertise over a wide range of pediatric disease processes, making rapid assessments and initiating action plans on transport or at the referring or receiving facility.
- Stabilize or remotely direct stabilization of patients at the referring facility and on transport, appropriately utilizing current Pediatric Advanced Life Support guidelines.
- Obtain training and maintain skills for transport coordination, referral, and acceptance, including specialized transport issues such as flight physiology as appropriate.
- Where pediatric hospitalists' roles include participation in neonatal transport, appropriately utilize current Neonatal Resuscitation Program and STABLE Program guidelines.
- Recognize when to consult subspecialist, intensivist, or surgeon.
- Accurately document actions and discussions in the medical record.

ATTITUDES

Pediatric hospitalists should be able to:

- Respond promptly and courteously to all calls and requests for transport.
- Participate in educational programs for transport team members and community referral sources.
- Provide mentorship to junior hospitalists on all aspects of transport including clinical decision making, risk management, customer service, and operational issues.
- Communicate effectively with patients and the family/caregiver regarding the need for and their role in the transport, as appropriate.
- Establish and maintain good working relationships with referral sources and transport team members.
- Recognize and manage patient care related conflicts among transport team members or referring facility in a prompt and judicious manner.

SYSTEMS ORGANIZATION AND IMPROVEMENT

In order to improve efficiency and quality within their organizations, pediatric hospitalists should:

- Work with hospital administration, transport team members, and specifically with the transport program manager, on the growth and development of the pediatric transport service and or policies.
- Lead, coordinate or participate in ongoing educational opportunities to maintain the skill set of team members and transport coordinators.
- Lead, coordinate or participate in the development and implementation of cost-effective, safe, evidence-based care pathways to standardize the management of common diagnoses for children transported between facilities.
- Lead, coordinate or participate in establishing a multidisciplinary forum such as morbidity and mortality conference to regularly review cases with a goal of improving system-wide processes and outcomes.

TABLE 1. Options for Pediatric Inter-facility Transport (may vary according to local and regional resources)

Transport Modality	Advantage	Disadvantage
Non-medical (family/caregiver)	Low cost.	No ability to intervene as condition deteriorates. Transport may be delayed due to detours or misdirection.
BLS Ambulance or volunteer ambulance	Emergency Medical Technician escort. Some ability to intervene if condition deteriorates.	Little to no pediatric experience thus interventions are limited. Transport may be delayed due to variable ambulance availability.
ALS Ambulance or mid-level transport	Paramedic escort; 1500-2000 hours of medical training, including O2 administration, nebulized medications, ALS, and airway skills. Greater ability to triage and intervene if condition deteriorates.	Pediatric training not uniform. Paramedics primarily trained for extrication, intervention and rapid transport.
CCT ambulance	Critical care nurse team member. Allows for higher level of assessment and intervention.	Pediatric expertise is uncommon.
Specialized pediatric-neonatal critical care transport service	2-3 member team composed of RN and RT (pediatric/neonatal critical care) and physician (hospital or emergency medicine, intensivist). Specialized pediatric assessment, monitoring, diagnostic, and interventional skills allows for high level pediatric care from initial referral.	High cost, limited resources.