Title: State Response to Poor Outcomes of Inappropriate Transport of Pediatric Trauma Patients

Authors: Richard Wisniewski, BS, NRP; Karen Moore, BA, NREMT; Kevin Polley, MD, Amanda Felder, MSN, BSN, RN; Laura Strickland, MBA, BSN, RN

Introduction: Nationwide, adult patients are transported based on the capabilities of each facility. Trauma patients are no different. However, pediatric trauma patient transport patterns seem to be to the closest trauma center instead of the closest appropriate care center. This results in lengthy delays in transferring patients to the pediatric trauma centers (PTC), increased cost for the patients and families, and potential worsening conditions up to and including death. At least two cases were identified to be potentially preventable pediatric deaths. After attempting to address this situation on a local EMS level, it was advised that change would need to come as a state requirement. As a result, the state office enlisted a multiagency, multidisciplinary working group to draft a mandatory statewide Pediatric Trauma Transport Protocol.

Objective: Establish a mandatory statewide Pediatric Trauma Transport Protocol.

Methods: Approximately 12 stakeholders engaged in the working group with representation from each region of the state. The protocol was based on the 2011 CDC guidelines, clinical experience and expertise, and discussed local modifications. The working group included pediatric trauma surgeons, pediatric emergency department physicians, pediatric trauma program managers, emergency medical services providers, air medical transport providers and the state office personnel.

The group searched for evidence based, peer reviewed articles and any additional information regarding pediatric transport protocols and found none. There is little to no available data linking transport of pediatric patients directly to a PTC by EMS to outcomes. However, there is data to show that pediatric trauma patients treated at PTCs have improved outcomes. Through data analysis and information from South Carolina Revenue and Fiscal Affairs (SCRFA) and South Carolina Health Information Exchange (SCHIEx), we found this pattern was consistent within South Carolina as well. The state EMS office, along with SCRFA and SCHIEx is currently in the process of linking EMS data to outcomes data to facilitate a retrospective analysis, which will establish a baseline to determine the effectiveness of the protocol.

The protocol provides EMS providers multiple tools: specific pediatric criteria, length of transport guidelines, clinical discretion to bypass an adult trauma center or transport to the nearest trauma facility based on signs of physiologic decline. Additionally this is intended to route pediatric trauma patients to the appropriate pediatric trauma center bypassing any adult or general designated facility. Routing directly to a PTC will reduce transfer times and time to definitive treatment for the pediatric population. The length of transportation guideline for certain criteria based on injury and mechanistic indicators was determined by geographic location of in-state and out of state PTCs. Also considered was the current average ground transport time and availability of air medical resources in the state.

In 2017, 60,311 patients aged 0-16 with a trauma diagnosis were seen in South Carolina emergency departments. Of these, 1,071 were admitted for in-patient care, 28 to non-designated trauma centers, 71 to adult trauma centers and 972 to pediatric trauma centers. There were zero deaths of those admitted to non-designated trauma centers, 4 deaths in the adult trauma centers and 5 deaths in the pediatric trauma centers. Based on these numbers, there is a five times greater chance of death when a pediatric trauma patient is admitted to an adult trauma center versus a pediatric trauma center. The 28 patients admitted to non-designated centers had mild to moderate non-life threatening injuries. The most severely injured patients appear to have been transported directly to a trauma center. Further analysis is pending linkage of EMS data to outcomes.

After the initial draft and revisions of the protocol, it was vetted and approved by the state Trauma Advisory Council, the EMS for Children Advisory Committee and the state EMS Advisory Council. This protocol will be implemented for use on July 1, 2019.

Results: Only about 20% of the pediatric patients with a trauma diagnosis were transported by EMS. Of those, approximately 10% were admitted to a pediatric trauma center. On average, there is a 30% chance of mortality of pediatric trauma patients admitted to an adult trauma center versus a pediatric trauma center.

The state office is currently in the process of linking patients transported by EMS to their outcome to establish more accurate baseline data to adequately assess the protocol after implementation. Additionally, the PTCs of the state have committed to examining over and under triage data and outcomes.

Conclusion: Currently, there is no evidence that a protocol of this nature exists. Additionally, information on outcomes tied to direct EMS transport is unavailable. Through linkage in the state we will be able to accurately determine the actual impact of implementation of the protocol on outcomes. The workgroup participants hope that this protocol will serve as a guideline to be adopted nationwide to more accurately address the need for direct transport to a pediatric trauma center.