RESEARCH

CE 1.5 ANCC Contact Hours

Evaluation of an After-Hours Child Passenger Safety Resource Guide

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ABSTRACT

Motor vehicle crashes are a leading cause of unintentional injury deaths for children in the United States. Child safety seats are effective in reducing the rate and severity of injury for children. Families seen in an emergency department (ED) outside of injury prevention (IP) operational hours may not have the same opportunity to obtain a child safety seat due to the unavailability of IP resources. This study evaluated the effectiveness of a resource guide that assists the ED staff to screen and provide the appropriate child safety seat. Two retrospective cohort analyses were conducted to assess the following: (1) patients seen in the ED who were eligible to be screened through the resource guide; and (2) patients who were screened and received a restraint system through the resource guide. Records for both cohorts were reviewed from May 1, 2015, to February 29, 2016. Descriptive statistics were used to describe each cohort. In Cohort 1, 10.6% of the 113 patients meeting criteria were screened for a restraint system. In Cohort 2, 20 patients received a restraint system through the resource guide and 90% of these received the appropriate restraint system for their age and weight. Our results demonstrate the need for an algorithm to increase consistency of the resource guide's utilization. Algorithm development to identify screening candidates, further refinement of the guide's restraint identification process, and staff training may improve this tool to ensure that all patients, despite the availability of IP staff, are screened for the appropriate child safety seat.

Key Words

Car seats, Child passenger safety, Injury prevention

Motor vehicle crashes (MVCs) are the leading cause of unintentional injury deaths for children 5–14 years of age in the United States (Centers for Disease Control and Prevention [CDC], 2016). In 2015, the CDC reported 663 deaths of children 12 years and younger as a result of an MVC, of which 35% were unrestrained (National Center for Statistics and Analysis, 2017). In the same year, 136,244 children younger than 12 years sustained nonfatal injuries because of an MVC (CDC National Center for Injury Prevention and Control, 2015c). This is a particular issue in Texas because, in 2016, the death rate for children 0–12 years of age involved in an MVC (0.68/100,000 population) (CDC National Center for Injury Prevention and Control, 2015b) was higher than the national death rate for children 0–12 years of age involved in an MVC (0.57/100,000 population) (CDC National Center for Injury Prevention and Control, 2015a).

Rollover crashes result in the highest rates of injury, with unrestrained children being three times as likely to sustain an incapacitating injury compared with restrained children. In side-impact crashes, unrestrained children are eight times as likely to sustain an incapacitating injury compared with restrained children. These injuries may often go unnoticed until later in the child's life when further brain development has occurred and deficits become apparent (National Highway Traffic Safety Administration [NHTSA], 2010). In 2010, medical and work loss costs for children 0–12 years of age who were involved in an MVC were nearly $400 million for fatalities, more than $1.2 billion for nonfatal injuries, and nearly $740 million for those treated and released from emergency departments (EDs) (CDC National Center for Injury Prevention and Control, 2010a, 2010b, 2010c). The high incidence of child injury and death related to MVCs emphasizes the importance of child passenger safety and injury prevention (IP) efforts, as many of these injuries and deaths could have been prevented if the child were using the appropriate restraint system. Child safety seats are effective in reducing the rates of injury for children (NHTSA, 2010). In fact, the risk of death is reduced by as much as 71% by correctly using child safety seats (Durbin, 2011). Children who use an age-appropriate child safety seat in the rear seat of a vehicle are at the lowest risk for injury (Durbin, Chen, Smith, Elliott, & Winston, 2005; Macy &

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Freed, 2012). Children who are transitioned to seat belts before the fit is appropriate are at an increased risk of injury (Macy & Freed, 2012).

The American Academy of Pediatrics (AAP) recommends that children be restrained in rear-facing car seats until 2 years of age or until they reach the maximum height and weight for their seat. In addition, the AAP advises that all children should ride in a forward-facing car seat with a harness as long as possible, until they reach the height and weight maximum of the seat, and then a booster seat until they have reached 4 ft 9 in. and are between 8 and 12 years of age (Durbin, 2011). Every state in the United States requires infants and children to ride in child safety seats, but the requirements regarding age, height, and weight vary greatly. Forty-nine states require booster seats for children who have outgrown a child safety seat but are still too small to use an adult seat belt. Eleven states require children younger than 2 years to ride rear facing in a child safety seat (Governors Highway Safety Association, 2017). Texas law requires that all children younger than 8 years, unless they are taller than 4 ft 9 in., are required to be restrained in an appropriate child safety seat according to the manufacturer's instructions when riding in a passenger vehicle (Texas Department of Public Safety, 2018).

In 2010, 140,990 children 12 years and younger were treated and released from EDs after an MVC (CDC National Center for Injury Prevention and Control, 2010c). The ED can be an effective place for IP information, specifically child passenger safety education, to be delivered to ensure that children are transported home safely after discharge. Emergency physicians realize the importance of providing child passenger safety information in the ED but may not routinely recall best practice information accurately (Zonfrillo, Nelson, & Durbin, 2011). Physicians' awareness of resources available to families in the hospital and the community could increase the number of children riding appropriately in child safety seats and booster seats. These efforts may be best addressed when there is collaboration between clinicians, nurses, social workers, and other department staff members in the ED (Macy, Clark, Cunningham, & Freed, 2013). Nurses are especially critical to providing child passenger safety information, as they often have the most interaction with patients in the ED (Kuska & Zonfrillo, 2017). When nurses and other staff members provide child passenger safety education to parents, it is most effective to explain the material in an age-appropriate manner (Shenoi, Saz, Jones, Ma, & Yusuf, 2010), with the reasons behind the recommendations explained in simple, plain language (Will, Decina, Maple, & Perkins, 2015).

After MVCs, there is a low rate of provision of child passenger safety information to families in EDs (Zonfrillo et al., 2011). This is a critical opportunity to provide information and resources to families as NHTSA Crash Criteria recommend that individuals replace a child safety seat after a moderate or severe car crash. Children in minor crashes may not need to replace their car seat. The NHTSA describes a moderate or severe crash to be one where at least one of the following statements is true: (1) the vehicle was not able to be driven away from the crash site; (2) the vehicle door nearest the car seat was damaged; (3) any passenger in the vehicle sustained an injury in the crash; (4) if the vehicle has air bags, the air bags deployed; or (5) there is visible damage to the car seat (NHTSA, n.d.).

The AAP states that child passenger safety technicians (CPSTs) can be useful sources of information regarding appropriate car seat use and installation, especially in atypical circumstances. However, when CPSTs are unavailable, an algorithm may serve as an appropriate guide for general best practice recommendations (Durbin, 2011). The ED can be an important setting in which to include child passenger safety resources and education, as many children who utilize EDs may have limited access to a primary care provider who may typically provide child passenger safety information (Macy et al., 2013). Aside from having a serious medical issue, the most common reason children are brought to EDs is because their primary care provider's office is not open (Gindi & Jones, 2014). Clinical encounters can be an effective time to disseminate child passenger safety information because some families are not reached by public health messaging and community education (Macy & Freed, 2012).

The IP team at the study site recognized that families seen in the ED outside of IP operational hours historically did not have the same opportunity to obtain a restraint system due to the unavailability of the IP staff to facilitate consults. To aid in closing this gap in services, a comprehensive resource guide, tailored to the hospital's child passenger safety procedures, was created to assist ED providers and staff in efficiently providing parents with accurate child passenger safety information and selecting an age-appropriate child safety seat for children in the event they visit the ED due to an MVC when the IP team is unavailable. The objective of this study was to evaluate the effectiveness of this Child Passenger Safety Resource Guide (Resource Guide) at aiding the ED staff to screen and provide the appropriate restraint system.

METHODS

Study Site

Retrospective data for two distinct cohorts were obtained from a children's hospital in Central Texas with a Level 1 trauma center. Level 1 trauma centers maintain the highest level of resources available, enabling total care management for the most severely injured patient. Furthermore,

these trauma centers are required by the American College of Surgeons to have the IP staff to identify and provide educational programming tailored to the community's most common causes of injury (American College of Surgeons, 2014).

The IP team of the children's hospital in this study maintains a spectrum of programming efforts serving its community including completing child passenger safety consultations, identifying adaptive transportation solutions for children with special needs, facilitating routinely scheduled child safety seat checks, as well as training staff and community members to become certified CPSTs. Furthermore, the IP team operates the Safety Station, located in the hospital's Family Resource Center, which provides the patient families with an in-house safety store Monday through Friday 10 AM–6 PM as well as weekends 12–5 PM. This extension of IP services allows patient families to be appropriately fitted for child safety seat outside the IP team's office hours, which are Monday through Friday 8 AM–5 PM. In addition, other resource materials and safety devices (e.g., bicycle helmets, safe sleep and child proofing devices) are available at reduced costs for patient families.

Children admitted to the Trauma Service who may benefit from IP resources are consulted by the IP team. The goal of many of these consultations is to assess whether the child is currently restrained in the appropriate child safety seat. If the child is not appropriately restrained, the IP coordinator will educate patient families on how to use their child safety seat correctly or determine that a new child safety seat is necessary. Injury prevention coordinators offer child safety seats at no cost to families with a child admitted following an MVC. Provision of child safety seats is not dependent on the patient's insurance status or ability to pay. Child safety seats provided to patients are included in the IP team's annual budget as a commitment to the hospital's mission of serving the poor and vulnerable.

The IP team identified a gap in resources: patients involved in MVCs arriving and departing the hospital outside of IP staff and Safety Station hours of operation. In response to this need, the Resource Guide was developed to allow the ED staff to convey IP expertise to families with patients younger than 8 years presenting to the hospital following an MVC when the IP team was not available. The Resource Guide contained the following six components: (1) information to guide the ED staff to determine whether the patient needs a child safety seat according to NHTSA guidelines; (2) information to determine the accurate seat for the patient; (3) instructions on how to obtain the child safety seat; (4) a liability form for the patient to complete; (5) a documentation form to track child safety seats provided; and (6) child passenger safety information sheets on best practices and community resources. The Resource Guide focused specifically on children younger than 8 years so that families would be in compliance with the Texas child passenger safety laws upon discharge from the ED (Texas Department of Public Safety, 2018).

Before implementing the Resource Guide, the IP team had meetings with ED management to ensure the Resource Guide would be supported at the leadership level. The IP team then attended ED staff meetings to gather feedback and answer questions to ensure accurate utilization of the Resource Guide. On the basis of ED staff recommendations, the Resource Guide was located in the designated ED cabinet where resource materials are frequently accessed. Charge nurses and social workers were selected by the ED staff to provide child safety seats to patients utilizing the Resource Guide and completing required documentation due to their frequent and consistent contact with patients. The IP team trained charge nurses and social workers through presentations detailing the six components of the Resource Guide described earlier. Interactive discussions were then facilitated by the IP team, which provided the staff an opportunity to ask questions and walk through patient scenarios.

As detailed in Figure 1, the ED staff would locate the Resource Guide and verify that NHTSA Crash Criteria were met, that the child was unrestrained in MVC, and/or that the child does not own or use a child safety seat. NHTSA Crash Criteria state that a child safety seat should be replaced if involved in a moderate to severe crash (NHTSA, n.d.). For patients meeting this eligibility and with length of stay (LOS) likely to be outside of IP and Safety Station hours, the ED staff complete standard-of-care documentation contained in the Resource Guide. This documentation includes a seat selection matrix to assist the ED staff member in making the appropriate seat selection for the child based on age, weight, and height (see Table 1). Once the appropriate child safety seat is identified, a child safety seat request form is completed and later used for the IP team's inventory for child safety seat management. In addition, the family completes a liability form and is provided resource handouts that encourage child safety seat inspection. Patients not meeting Resource Guide eligibility are either referred to the IP team or Safety Station during hours of operation depending on their safety needs and/or questions.

Cohort Identification

Two cohorts were obtained to evaluate the utilization of the Resource Guide (Cohort 1) and the ED staff's accuracy of providing patients with the appropriate child safety seat using the Resource Guide (Cohort 2). In Cohort 1 and Cohort 2, children younger than 8 years surviving an MVC and brought to the ED between May 1, 2015, and February 29, 2016, were included. Cohort age range was

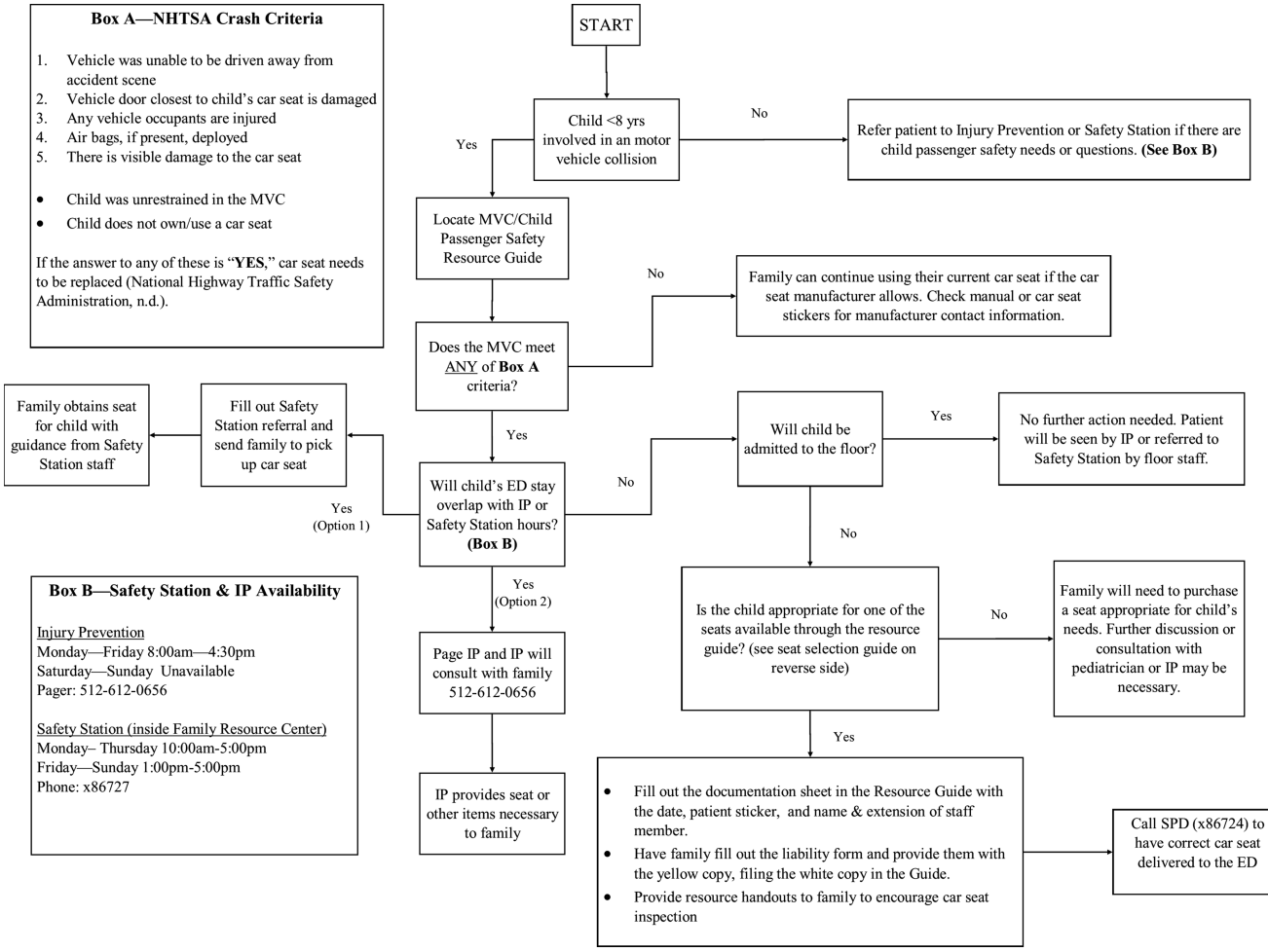

Figure 1. Emergency department Child Passenger Safety Resource Guide utilization flowchart. ED = emergency department; IP = injury prevention; MVC = motor vehicle crash; NHTSA = National Highway Traffic Safety Administration.

chosen to be consistent with Texas's child occupant safety law, which requires children younger than 8 years to be in the appropriate child safety seat unless the child is taller than 4 ft 9 in. (Texas Department of Public Safety, 2018).

Cohort 1 included the total number of patients who met criteria to be assessed for a child safety seat via the Resource Guide. A Decision Support Services database was queried to obtain patient data with *International Classification of Diseases, Ninth Revision* (*ICD-9*) and *International Classification of Diseases, Tenth Revision* (*ICD-10*) external cause codes relevant to MVC: *ICD-9* codes beginning with E81, E822, E823, and E825, and *ICD-10* codes beginning with V4, V5, V6, V7, V8, or Z04.3. To mitigate the decreased sample size due to potential coding errors, we queried the following: (1) visit reason for text inclusive of "MVC" and (2) chief complaint for text inclusive of "MVC" or "vehicle." Additional exclusion criteria were applied including that the patient could not overlap in patient LOS with IP staff and Safety Station operating hours and the patient needed to meet NHTSA Crash Criteria. This was to ensure Cohort 1 captured only patients meeting Resource Guide utilization eligibility per Figure 1.

Cohort 2 included patients who received a child safety seat by the ED staff through the Resource Guide. These patients were identified via the standard-of-care child safety seat request form that the ED staff completed. Patients incidentally screened with the Resource Guide during IP and Safety Store operating hours were retained in this cohort.

Data Analysis

Data from Cohort 1 and Cohort 2 were supplemented with additional variables from the trauma registry, medical records, and other hospital databases. Descriptive statistics were used to describe characteristics of each cohort. Variables included patient age (in years), race/ethnicity (Hispanic, White non-Hispanic, Black non-Hispanic, and other non-Hispanic), gender (male and female), primary language (English, Spanish, and bilingual in English and

TABLE 1 Emergency Department Resource Guide Child Safety Seat Selection Matrix

Seat Type	Child Size	Direction	Reason
Convertible (B seat) 	• Birth–2 years of age • Under 50 lb	• Rear-facing children birth to 2 years old up to 40 lb • Forward-facing children older than 2 years up to 50 lb	Children should be rear facing until 2 years of age or until maximum rear-facing height and weight of seat. The seat can be used forward facing after the child is 2 years old.
Combination (C seat) 	• 2–4 years • 22–45 lb • Under 4 ft 9 in.	• Forward-facing children only up to 50 lb • Converted to booster by removing harnesses for children over 50 lb • Booster mode until children at least 8 years or 4 ft 9 in./100 lb	Children under 50 lb are safer in a five-point harness. This seat can convert to a booster after the child is 50 lb.
High back booster (D seat) 	• 4 years+ • 45–100 lb • Under 4 ft 9 in.	• Forward facing with seat belt • No harness • Must always use both lap and shoulder belts	Texas law states that children younger than 8 years need to be in a child restraint. A child under 4 ft 9 in. and under 100 lb can be safer in a booster seat regardless of age.

Spanish), weight (kg), and hospital LOS (days). In addition, Cohort 1 included a variable of whether a child safety seat was received via the Resource Guide (received and did not receive). Cohort 2 included variables of whether the patient was eligible for Resource Guide based on the flowchart of utilization displayed in Figure 1 (eligible and ineligible), type of child safety seat provided (convertible, combination, or booster), and accuracy of child safety seat provided (accurate and not accurate). Accuracy of child safety seat provided was determined by the IP staff based on whether the seat provided was appropriate for the patient's age and weight (see Table 1). Demographic statistics were used to describe characteristics of Cohort 1 and Cohort 2. The Seton institutional review board approved this study.

RESULTS

Cohort 1 included 113 patients who met criteria to be assessed for a child safety seat via the Resource Guide (see Table 2). The average age of the patient was 3.4 years. More than half of the patients meeting screening criteria were male (54%). The majority of patients reported their race/ethnicity as Hispanic (47%), with the remaining patients reporting as White non-Hispanic (35%), Black non-Hispanic (15%), and other non-Hispanic (3%). Most patients reported English as their primary language (86%), with the remaining patients reporting as Spanish (8%) or bilingual in English and Spanish (6%). The average LOS in the hospital was 2.6 hr. In Cohort 1, only 11% of the 113 patients who met criteria to be screened for a child safety seat were in fact screened and received a child safety seat; however, it is not known how many patient families screened positive for needing a new child safety seat but declined receiving one.

Cohort 2 included 20 patients who received a child safety seat through the Resource Guide (see Table 3). The average age of the patient was 2.6 years. More than half of the patients were female (60%). The majority of patients reported their race/ethnicity as Hispanic (70%), with the remaining reporting as White non-Hispanic (20%) or Black non-Hispanic (10%). Fifty percent of the patients in Cohort 2 reported their primary language as English,

TABLE 2 Descriptive Characteristics of Cohort 1 (*N* = 113)

Characteristics	*M* ± *SD* or *n* (%)
Demographic characteristics	
Age (in years)	3.4 ± 2.4
Race/ethnicity	
Hispanic	53 (47)
White non-Hispanic	40 (35)
Black non-Hispanic	17 (15)
Other non-Hispanic	3 (3)
Gender	
Male	61 (54)
Female	52 (46)
Primary language	
English	96 (86)
Spanish	10 (8)
Bilingual (English and Spanish)	7 (6)
Hospital characteristics	
Length of stay (in hours)	2.6 ± 1.2
ED Child Passenger Safety Resource Guide use	
Received a child safety seat	12 (11)
Did not receive a child safety seat	101 (89)

Note. ED = emergency department. Hispanic ethnicity includes patients reported race of White Hispanic (n = 45), Black Hispanic (n = 1), and other Hispanic (n = 7).

TABLE 3 Descriptive Characteristics of Cohort 2 (*N* = 20)

Characteristics	*M* ± *SD* or *n* (%)
Demographic characteristics	
Age (in years)	2.6 ± 2.1
Race/ethnicity	
Hispanic	14 (70)
White non-Hispanic	4 (20)
Black non-Hispanic	2 (10)
Other non-Hispanic	0 (0)
Gender	
Male	8 (40)
Female	12 (60)
Primary language	
English	10 (50)
Spanish	8 (40)
Bilingual (English and Spanish)	2 (10)
Hospital characteristics	
Length of stay (in hours)	3.5 ± 1.6
Eligibility of patients	
Eligible	12 (55)
Ineligible	8 (45)
Type of child safety seat provided	
Convertible	7 (35)
Combination	7 (35)
Booster	6 (30)
Accuracy of child safety seat provided	
Not accurate	2 (10)
Accurate	18 (90)

Note. Hispanic ethnicity includes patients reported race of White Hispanic (n = 13) and other Hispanic (n = 1).

with 40% reporting their primary language as Spanish and 10% reporting being as bilingual in Spanish and English.

In Cohort 2, the average LOS in the hospital was 3.5 hr. More than half of the patients were eligible to receive a child safety seat (55%) based on our criteria for eligibility. All eight patients not meeting eligibility criteria received the appropriate child safety seat through the Resource Guide during hours that the IP team was available. Of the child safety seats provided to patients in Cohort 2, 35% were convertible seats, 35% were combination seats, and 30% were booster seats.

When examining the child safety seats provided, the ED staff demonstrated a high accuracy of providing the appropriate child safety seat to patients, as 90% of patients received the appropriate child safety seat for their age and weight. Two children, aged 6 and 4 years and weighing 35.4 and 39.6 pounds (lb), respectively, received a booster seat when a combination seat with a five-point harness is the best practice.

Patients in Cohort 1 (i.e., patients who met criteria to be screened for a child safety seat via the Resource Guide) and Cohort 2 (i.e., patients who received a child safety seat through the Resource Guide) are not mutually exclusive. Twelve patients met eligibility to be screened and received a child safety seat through the Resource Guide. For this reason and the small sample size of Cohort 2, statistical comparisons between the two cohorts were not performed.

DISCUSSION

It has been well established that the proper use of child safety seats is an effective method to reducing the risk of injury and death of children in motor vehicle collisions (Brown, McCaskill, Henderson, & Bilston, 2006; Durbin,

2011; Durbin et al., 2005; Kuska, 2013; Sauber-Schatz, Thomas, & Cook, 2015; Shenoi et al., 2010). Level 1 trauma centers are required to provide IP resources to patients and the community, ideally with trauma physicians, nurses, and staff participating in these initiatives (American College of Emergency Physicians, 2008; American College of Surgeons, 2014). Children who present to hospital EDs after an MVC may need child passenger safety resources and education before being discharged home. If the child arrived after hours, however, IP resources historically were not available. To the knowledge of the researchers on this study, this is the first evaluation of an ED Resource Guide designed to fill this gap in services.

This study found that making a Resource Guide available to the ED staff 24/7 increased access to child passenger safety information and provided a means to request child safety seats for eligible patients, given that 12 patients received a child safety seat that likely would not have without the Resource Guide. Utilization of the Resource Guide, however, appears to be low, as the 12 patients who received a child safety seat only made up 11% of the patients meeting criteria to be screened. It is important to state, though, that it is not known how many patient families screened positive for needing a new child safety seat but declined receiving one. Despite this qualification, evidence points to the need for the IP team to increase knowledge about the Resource Guide to the ED staff to ensure they are utilizing it to screen patients more consistently.

For those ED staff who utilized the Resource Guide, nearly all children received the most appropriate child safety seat for their age and weight demonstrating the accuracy of the ED staff's use of the Resource Guide. Two children were erroneously provided a booster seat and should have received a combination child safety seat to maximize the benefit of a five-point harness. The Resource Guide recommends that children under 40 lb receive a combination seat so that they can maximize use of a five-point harness as long as possible. It is possible that the ED staff took this information into consideration when selecting a child safety seat, realizing that both patients may reach the 50-lb maximum weight for the harness of the combination seat quickly and would potentially have to transition the seat to booster mode in a short amount of time. It is also possible that because the children were older, 4 and 6 years of age, the ED staff assumed a booster seat was most appropriate. It is important to note that one of the two children who received an inappropriate child safety seat was provided the child safety seat when the IP team was available and the Family Resource Center was open. This suggests that the ED staff may have been rushed or unaware of all the resources available. Further education and training are necessary to ensure the ED staff are aware of the IP team and Family Resource Center hours and have a solid foundation of child passenger safety principles to be able to determine the correct child safety seat for a child after hours.

Many of the children in Cohort 2 who received a child safety seat using the Resource Guide were not eligible. That is, they were seen in the hospital's ED for reasons other than involvement in an MVC, and/or during hours when the IP team was available or the Family Resource Center was open, which is the preferred process for patients to obtain child safety seats. Although the resource guide was intended for children involved in an MVC and seen after hours, this may suggest that the Resource Guide is convenient for staff use in a busy ED setting to meet patients' needs, regardless of their reason for visit, and discharge them in a timely manner. Child passenger safety is recommended to be discussed at every health supervision visit by the AAP (Hagan, Shaw, & Duncan, 2017), but for children who have limited or no access to a primary care doctor, the ED can play an important role in disseminating this information (Macy et al., 2013). Although there are child passenger safety resources and low-cost child safety seats available in the community, the ED staff have, but often underutilize, the opportunity to provide this education and/or child safety seats to patients during their ED visit due to high patient volumes, lack of time, and insufficient staffing (Kuska & Zonfrillo, 2017). Having comprehensive age-appropriate child passenger safety materials easily accessible to the ED staff can increase the number of parents educated, which may result in preventing future injuries (Zonfrillo et al., 2011). Findings from this study highlight the advantage of a Resource Guide to facilitate the provision of adequate and appropriate child passenger safety resources in the ED 24/7 for children involved in MVCs. Additional staff education and efforts to increase IP visibility in the hospital may be necessary to encourage the staff to contact the IP team during available hours. In doing so, the patient has an opportunity to ask questions and receive thorough child passenger safety resources and one-on-one education by trained CPSTs who specialize in educating families, are aware of the complexities of how to use and install child safety seats, and can demonstrate proper use by utilizing a vehicle seat demonstrator.

Findings showed that patients in Cohort 2, who received a child safety seat using the resource guide, had a longer LOS than those in Cohort 1, which comprised patients who met criteria to be screened for a child safety seat. This is consistent with research that says that the lack of time is a barrier in the ED, even though parents are often willing to prolong their ED visit to receive IP information (Zonfrillo et al., 2011). No statistical comparison was made between the two cohorts due to the two groups not being mutually exclusive. However, one potential way to improve ED throughput for patients receiving a child

safety seat would be to implement an algorithm, using the utilization flowchart (see Figure 1), to assist the ED staff in consistently and efficiently navigating the recommendations of the Resource Guide in a consolidated format. An algorithm could concisely present the best practice recommendations and help facilitate the provision of appropriate child safety seats for patients in the ED when a CPST is not available (Durbin & Hoffman, 2018). Furthermore, ED staff documentation of algorithm utilization would enable the IP team to monitor adherence and inform process improvement efforts. The results of this study, accompanied with literature, provide evidence for the need to implement a Child Passenger Safety Resource Algorithm with pathways for the ED staff to follow in order to ensure the appropriate child safety resources are provided.

Despite efforts to conduct a rigorous study, limitations did exist including the fact that this study was limited to one pediatric hospital's ED and results may not be generalizable to other populations. Another limitation of this study was that the height of each child was not able to be verified because it was not consistently available in the electronic medical record. Selection of a child safety seat typically involves using age, height, and weight to determine the most appropriate seat (CDC National Center for Injury Prevention and Control, 2016). The possibility exists that a child may have not received the correct seat if he or she was outside the seat's required height range. An additional limitation exists in that the number of patients in Cohort 1 who screened positive for needing a new child safety seat but declined receiving one is not known. For this reason, the true utilization rates are not known. This may have occurred because a family was able to obtain a child safety seat through other means. This study was also not able to identify how many child safety seats were provided without documentation or the appropriateness of the child safety seats provided in these circumstances, which could occur in a busy ED. This limitation further limits our ability to show true utilization of the Resource Guide and limits our ability to show true accuracy of providing the appropriate child safety seat. An algorithm, as discussed earlier, would allow the IP team to monitor the pathways for each patient who presents to the ED after hours due to an MVC to ensure that each eligible patient is screened for child safety seat resources and receives the appropriate child safety seat.

CONCLUSION

Our findings provide evidence that a Resource Guide can be an effective means to distributing child passenger safety information and appropriate child safety seats to families of children who have experienced an MVC. This is particularly important because the resource guide fills a gap when traditional IP resources are not available on nights and weekends. The results also provide evidence to support the creation of an algorithm to streamline utilization of the Resource Guide and provide a method to more accurately track whether patients were screened for a restraint system and whether patients received the appropriate restraint system. Our study also supports other research studies that conclude that continuous improvement of the education process for the ED staff and parents regarding appropriate selection and use of child safety seats is necessary (Morse et al., 2017; Zonfrillo et al., 2011). With adequate training and a partnership between an ED and the IP team, children involved in MVCs will receive more robust child passenger safety resources in concordance with current best practice recommendations regardless of the time they present to the ED.

KEY POINTS

- Injury prevention is a valuable resource in children's hospitals but is often unavailable on nights and weekends. Without a process in place, patients experiencing an MVC may be discharged from the hospital ED without an appropriate child safety seat.
- Many ED staff members recognize the importance of child passenger safety in the ED, but most are not trained as CPSTs. When a CPST is not available, a Resource Guide in an ED can be an effective way for the ED staff to provide a child with the correct child safety seat and IP resources.
- Developing an algorithm to replace a Resource Guide could concisely present the best practice recommendations to the ED staff when CPSTs are unavailable. An algorithm would also allow the IP team to monitor pathway adherence for each patient and inform process improvement efforts.

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