

COMPILATION OF EMSC-FUNDED PEER-REVIEWED JOURNAL ARTICLES

Note: This document is not intended to represent all published EMSC-funded peer-reviewed journal articles available. To date, it encompasses a limited representation of published peer-reviewed journal articles supported by EMSC Targeted Issue grants, Special Initiatives grants, Program-supported member organizations of the EMSC Stakeholders Group and the EMS Partnership for Children Consortium, the EMSC National Resource Center (NRC), the National EMSC Data Analysis Center (NEDARC), and the Pediatric Emergency Care Applied Research Network (PECARN). Where available, abstracts are provided.

Aitken ME, Tilford JM, Barrett KW, Parker JG, Simpson P, Landgraf J, Robbins, JM. Health status of children after admission for injury. *Pediatrics*, 2002 Aug;110(2 Pt 1):337-42.

OBJECTIVE: Injury is the major cause of death in children ages 1 to 19 in the United States and is a leading cause of morbidity. Few studies have described the impact of injuries on the health status of affected children over time or used newer, child-specific measures in this population. The objective of this study was to describe the health status of children in the 6 months after admission for injury using child-specific health status measures. **METHODS:** Injured children who were ages 3 to 18 years and admitted to an academic children's hospital were evaluated at discharge and at 1 and 6 months after discharge with a battery of outcome measures. The Child Health Questionnaire (CHQ) measured health status. The scores on the Functional Independence Measure (FIM) or pediatric version of the FIM tracked physical function. **RESULTS:** A total of 195 children were enrolled. Boys outnumbered girls (67% vs 33%). Injury mechanisms and severity scores were typical of pediatric injury populations reported in other studies. Most (90%) children had at least 1 area of functional limitation by FIM at discharge, and 57% had some impairment at 1 month. By 6 months, 28% reported some limitation. At discharge, CHQ summary scores for the injury group were markedly depressed compared with normative populations. Differences in both physical health and psychosocial health summary scores between the injured and normal children persisted through 6 months of follow-up. Scores on 11 of 12 subscales were significantly below the normal population at discharge. This was particularly evident for bodily pain (injury group mean 49.1 vs normative mean 81.7) and parental impact-emotional (43.9 vs 80.3), and physical functioning (50.9 vs 96.1). Significant differences persisted in all subscales at 1 month and in 6 subscales at 6 months. **CONCLUSIONS:** The CHQ provided useful information about the impact of injuries on children and their families over time. Significantly reduced scores in several domains of the CHQ highlight problem areas for injury patients, several of which persist through 6 months of follow-up. Low scores in areas of bodily pain and parental emotional burden suggest that improved management of these problems is required. Additional study of risk factors for

persistent problems after injury may suggest ways to improve functional outcomes of injured children and reduce the impact on their families.

Allen K, Ball J, Helfer B. Preventing and managing childhood emergencies in schools. *J Sch Nurs*. 1998 Feb;14(1):20-4.

The Emergency Medical Services for Children (EMSC) program, initially funded in 1984, is jointly administered by the Health Resources and Services Administration and the National Highway Traffic Administration. The program is designed to reduce child and youth mortality and morbidity resulting from severe illness or trauma. Several initiatives, focused at the federal, state, and local levels, have established collaboration between the education and health communities. They include injury prevention education and programs in school settings; school and staff preparation for a medical emergency; and emergency care planning for school children with special health care needs. This article provides an overview of key issues.

Alpern ER, Stanley RM, Gorelick MH, Donaldson A, Knight S, Teach SJ, Singh T, Mahajan P, Goepf JG, Kuppermann N, Dean JM, Chamberlain JM for the PECARN. Epidemiology of a Pediatric Emergency Medicine Research Network: The Pediatric Emergency Care Applied Research Core Data Project. *Pediatr Emerg Care*. 2006 Oct;22(10):689-699.

OBJECTIVE: To examine the epidemiology of pediatric patient visits to emergency departments (ED). **METHODS:** We conducted a cross-sectional study of pediatric ED visits at the participating Pediatric Emergency Care Applied Research Network (PECARN) hospitals in 2002. We provide descriptive characteristics of pediatric ED visits and a comparison of the study database to the National Hospital Ambulatory Medical Care Survey (NHAMCS). Bivariate analyses were calculated to assess characteristics associated with hospital admission, death in the ED, and length of ED visit. We also performed multivariate regression to model the likelihood of admission to the hospital. **RESULTS:** Mean patient age was 6.2 years; 53.5% were boys; 47.5% black; and 43.2% had Medicaid insurance. The most common ED diagnoses were fever, upper respiratory infection, asthma, otitis media, and viral syndromes. The inpatient admission rate was 11.6%. The most common diagnoses requiring hospitalization were asthma, dehydration, fever, bronchiolitis, and pneumonia. In multivariate analysis, patients who were black or Hispanic, had Medicaid insurance or were uninsured, or were older than 1 year were less likely to be hospitalized. Demographics of the PECARN population were similar to NHAMCS, with notable exceptions of a larger proportion of black patients and of admitted patients from the PECARN EDs. **CONCLUSION:** We describe previously unavailable epidemiological information about childhood illnesses and injuries that can inform development of future studies on the effectiveness, outcomes, and quality of emergency medical services for children. Most pediatric ED patients in our study sought care for infectious causes or asthma and were

discharged from the ED. Hospital admission rate differed according to age, payer type, race/ethnicity, and diagnosis.

Atkins DL, Kenney M. AED safety and efficacy in children and adolescents. *Ped Clinics of North America*. 51:1443-1462, 2004.

Athey J, O'Malley P, Henderson D, Ball J. Emergency medical services for children: beyond the lights and sirens. *Prof. Psychology*. 1997 Oct Vol 28(5) pp.464-470.

Athey J, Dean JM, Ball J, Wiebe R, Melese-d'Hospital I. Ability of hospitals to care for pediatric emergency patients. *Pediatr Emerg Care*. 2001 Jun;17(3):170-4.

CONTEXT: The needs of children in emergency situations differ from those of adults and require special attention, yet there has been no study of the ability of U.S. hospitals to care for emergently or critically ill children. OBJECTIVE: To estimate the distribution of pediatric services available at U.S. hospitals with emergency departments (EDs). DESIGN: Self-report survey of 101 hospital EDs. PARTICIPANTS: Stratified probability sample of all U.S. hospitals operating EDs. RESULTS: The majority of hospitals that usually admit pediatric patients do not have separate pediatric facilities. Hospitals without a pediatric department, ward, or trauma service usually transfer critically injured pediatric trauma patients; however, nearly 10% of hospitals without pediatric intensive care facilities admit critically injured children to their own facilities. Likewise, 7% of hospitals routinely admit pediatric patients known to require intensive care to their adult intensive care units rather than transferring the patient to a facility with pediatric intensive care facilities. Few hospitals have protocols for obtaining pediatric consultation on pediatric emergencies. Appropriately sized equipment for successful care of infants and children in an emergency situation was more likely to be missing than adult-sized equipment, and significant numbers of hospitals did not have adequate equipment to care for newborn emergencies. CONCLUSION: Emergent and critical care of infants and children may not be well integrated and regionalized within our health care system, suggesting that there is room for improvement in the quality of care for children encountering emergent illness and trauma.

Ball JW, Liao E, Kavanaugh D, Turgel C. The Emergency Medical Services for Children Program: Accomplishments and Contributions. *Clin Pediatric Emerg Med*. 2006:1:6-14.

For 20 years, the Emergency Medical Services for Children (EMSC) program has raised awareness about the importance of providing emergency medical care to children that is matched to their physiological and psychological development, targeting healthcare professionals, emergency medical services (EMS) and trauma system planners, and the public. Since 1984, the EMSC program has provided federal funding to states and university schools of medicine to establish EMSC programs in all 50 states, the District of Columbia, and 5 US territories to help

improve the EMS system for children. Other EMSC program grant funding has been used to establish national resource centers, develop model products and resources, and support the infrastructure for a pediatric emergency care research network. The EMSC program also established partnerships with national organizations and federal agencies to improve awareness of children's special needs and integrate pediatric emergency care into the larger EMS system.

Blake E, Sherman K, Morris L, Lapidus G. Self-reported experience with safe transport of children with special healthcare needs: a rehabilitation therapist perspective. *Am J Phys Med Rehabil.* 2006 Feb;85(2):181-4.

Minimal information is available to occupational and physical therapists (rehabilitation therapists) regarding the safe transportation of children who have special healthcare needs (CSHCN). CSHCN may have conditions that impact their ability to be properly restrained in motor vehicles. We conducted an online survey of rehabilitation therapists to determine knowledge, formal training, experience and the amount of counseling provided to families regarding the safe transport of CSHCN before beginning an online training course. Eighteen percent (1075 of 6000) of invited rehabilitation therapists agreed to participate in the online survey. Most of the registered participants were physical therapists (70%) or occupational therapists (18%). A majority reported having little or no knowledge (53%), formal training (79%), or experience (54%), and conducted little or no counseling (61%) with families on the subject. The results of this survey indicate that rehabilitation therapists rate themselves as having low levels of knowledge, training, experience, and counseling of families regarding the subject of safe transportation of CSHCN. We recommend the development and implementation of a continuing educational program for rehabilitation therapists regarding the safe transportation of CSHCN.

Chamberlain JM, Singh T, Baren JM, Maio RF.

No abstract available.

Cheng TL, Wright JL, Markakis D, Copeland-Linder N, Menvielle E. Randomized trial of a case management program for assault-injured youth: impact on service utilization and risk for re-injury. *Pediatr Emerg Care.* 2008 Mar;24(3):130-6.

OBJECTIVES: The purposes of this study were to (1) assess receptiveness of families to violence prevention interventions initiated after an assault injury and (2) assess the effectiveness of a case management program on increasing service utilization and reducing risk factors for reinjury among assault-injured youth presenting to the emergency department. **DESIGN/METHODS:** A randomized controlled trial of youth, aged 12 to 17 years, presenting to a large urban hospital

with peer assault injury was conducted. Youth and parents were interviewed at baseline and 6 months to measure service utilization, risk behavior, attitudes about violence, mental health, and injury history. INTERVENTION: Intervention families received case management services by telephone or in person during 4 months by a counselor who discussed sequelae of assault injury and assessed family needs and facilitated service use. Controls received a list of community resources. RESULTS: Eighty-eight families were enrolled; 50 (57%) completed both youth and parent follow-up interviews. Intervention and control groups were not significantly different at baseline on demographics, service utilization, and risk factors. Fighting was common in both groups. Most parents and youth identified service needs at baseline, with recreational programs, educational services, mentoring, and counseling as most frequently desired. There was no significant program effect on service utilization or risk factors for injury. Although intervention families were satisfied with case management services, there was no significant increase in service utilization compared with controls. CONCLUSIONS: Youth and parents were receptive to this violence prevention intervention initiated after an emergency department visit. This pilot case management program, however, did not increase service utilization or significantly reduce risk factors for injury. More intensive violence prevention strategies are needed to address the needs of assault-injured youths and their families.

Cheng TL, Haynie D, Brenner RA, Wright JL, Chung SE, Simons-Morton B. Effectiveness of a mentor-implemented violence prevention intervention for assault-injured youth presenting to the emergency department: results of a randomized trial. *Pediatrics*. [In press]

No abstract available.

Copeland Linder N, Jones V, Haynie DL, Simons-Morton BG, Wright JL, Cheng TL. Factors associated with retaliatory attitudes among assault-injured adolescents. *J Pediatr Psychol*. 2007 Aug;32(7):760-70. Epub 2007 Apr 2.

OBJECTIVES: (a) To describe attitudes regarding retaliation among adolescents who have been assaulted. (b) To examine assault/event characteristics, personal, parental, and environmental factors associated with the retaliatory attitudes of adolescents who have been assaulted. METHODS: African American youth aged 10-15 years presenting to two large urban hospitals with peer assault injury and a parent/caregiver completed interviews in their home after their emergency department visit. RESULTS: Multivariate analyses revealed that lower SES, older age, and adolescents' perceptions that their parents support fighting were related to endorsing retaliatory attitudes. Girls who were aggressive were more likely to endorse retaliatory attitudes. However, level of aggression did not impact boys' retaliatory attitudes. Affiliating with aggressive peers influenced the retaliatory attitudes of boys, but did not influence girls' retaliatory attitudes. Overall, youths' perceptions of their parents' attitudes toward fighting had the greatest impact on

retaliatory attitudes. CONCLUSIONS: Adolescents' perceptions of their parents' attitudes toward fighting may be a factor in subsequent re-injury among youth. Violence prevention and intervention efforts need to involve components that assess parental attitudes and incorporate strategies to engage parents in violence prevention efforts. In addition, interventions for youth who have been assaulted may need to incorporate some gender-specific components in order to address the unique needs of girls and boys.

Corneli HM, Zorc JJ, Mahajan P, Shaw KN, Holubkov R, Reeves SD et al., for the Bronchiolitis Study Group of the Pediatric Emergency Care Applied Research Network (PECARN). A multicenter, randomized, controlled trial of dexamethasone for bronchiolitis. *N Engl J Med.* 2007 Jul 26;357(4):331-9.

BACKGROUND: Bronchiolitis, the most common infection of the lower respiratory tract in infants, is a leading cause of hospitalization in childhood. Corticosteroids are commonly used to treat bronchiolitis, but evidence of their effectiveness is limited. METHODS: We conducted a double-blind, randomized trial comparing a single dose of oral dexamethasone (1 mg per kilogram of body weight) with placebo in 600 children (age range, 2 to 12 months) with a first episode of wheezing diagnosed in the emergency department as moderate-to-severe bronchiolitis (defined by a Respiratory Distress Assessment Instrument score ≥ 6). We enrolled patients at 20 emergency departments during the months of November through April over a 3-year period. The primary outcome was hospital admission after 4 hours of emergency department observation. The secondary outcome was the Respiratory Assessment Change Score (RACS). We also evaluated later outcomes: length of hospital stay, later medical visits or admissions, and adverse events. RESULTS: Baseline characteristics were similar in the two groups. The admission rate was 39.7% for children assigned to dexamethasone, as compared with 41.0% for those assigned to placebo (absolute difference, -1.3%; 95% confidence interval [CI], -9.2 to 6.5). Both groups had respiratory improvement during observation; the mean 4-hour RACS was -5.3 for dexamethasone, as compared with -4.8 for placebo (absolute difference, -0.5; 95% CI, -1.3 to 0.3). Multivariate adjustment did not significantly alter the results, nor were differences detected in later outcomes. CONCLUSIONS: In infants with acute moderate-to-severe bronchiolitis who were treated in the emergency department, a single dose of 1 mg of oral dexamethasone per kilogram did not significantly alter the rate of hospital admission, the respiratory status after 4 hours of observation, or later outcomes. (ClinicalTrials.gov number, NCT00119002 [ClinicalTrials.gov]). Copyright 2007 Massachusetts Medical Society.

Dayan P, Chamberlain J, Dean JM, Maio RF, Kuppermann N. The Pediatric Emergency Care Applied Research Network: Progress and Update. *Clin Pediatr Emerg Med.* 2006;7:128-135.

The Pediatric Emergency Care Applied Research Network (PECARN), established in 2001, is the first federally funded national network of emergency departments focusing on research in emergency medical services for children (EMSC). With more than 800000 annual pediatric visits among its 21 participating emergency departments, the network has been able to study important conditions with infrequent or rare outcomes in diverse populations. In this report, we present the accomplishments from the first 4 years of the PECARN, providing details of completed and ongoing studies, major challenges faced and overcome, methods used to measure network progress and success, and future directions.

Dean J, Vernon DD, Cook L, Nechodom P, Reading J, Suruda A. Probabilistic linkage of computerized ambulance and inpatient discharge records: a potential tool for evaluation of emergency medical services. *Ann Emerg Med.* 2001 Jun;37(6):616-26.

STUDY OBJECTIVES: Emergency medical services (EMS) is an important part of the health care system. The effect of EMS on morbidity, mortality, and costs of illness is difficult to evaluate because hospital information is not available in out-of-hospital databases. We used probabilistic linkage to create such a database from ambulance and inpatient data and demonstrate the potential for linkage to facilitate evaluation of EMS responses resulting in hospital admission.

METHODS: Statewide ambulance and inpatient hospital discharge records were available for 1994 through 1996. Ambulance records indicating admission to the emergency department or hospital (165,649 records) were linked to inpatient hospital records indicating emergency admission (146,292 records) by using probabilistic linkage. Out-of-hospital data (dispatch code, treatments rendered, and ages), linkage rates, and inpatient data (discharge status, charges, length of stay, and payer category) were analyzed. **RESULTS:** We linked 24,299 (14.7%) ambulance events to inpatient hospital discharges. If we had used exact linkage methods, we would have only linked 14,621 record pairs, a loss of nearly 40%. Linkage rates were relatively constant between years (approximately 15%) but differed by ambulance dispatch codes. Out-of-hospital dispatch codes with high linkage rates included breathing problems (22.6%), chest pain (21.5%), diabetic problems (16.9%), drowning incidents (14.9%), falls (19.2%), strokes (32.8%), and unconsciousness or fainting episodes (16.1%). Linkage to the hospital record provided access to hospital outcome data. Inpatient mortality was 6.8%. Survivors were discharged home (60.7%), transferred to other acute-care facilities (3.6%) or intermediate-care facilities (23.3%), or discharged with home health care provision (4.9%). The median length of stay was 3 days, and median charges were \$6,620; total inpatient charges were \$286,737,067. **CONCLUSION:** Probabilistic linkage enables ambulance and hospital discharge records to be linked together and potentially increases our ability to critically evaluate EMS by providing access to hospital-based outcomes. Such evaluation will be further improved by linking to ED, other outpatient, and other public health data sources.

Dharmar M, Marcin JP, Kuppermann N, Andrada ER, Cole SL, Harvey DJ, Romano PS. A new implicit review instrument for measuring quality of care delivered to pediatric patients in the emergency department. *BMC Emerg Med.* 2007 Aug 23;7:13.

ABSTRACT: BACKGROUND: There are few outcomes experienced by children receiving care in the Emergency Department (ED) that are amenable to measuring for the purposes of assessing of quality of care. The purpose of this study was to develop, test, and validate a new implicit review instrument that measures quality of care delivered to children in EDs. **METHODS:** We developed a 7-point structured implicit review instrument that encompasses four aspects of care, including the physician's initial data gathering, integration of information and development of appropriate diagnoses; initial treatment plan and orders; and plan for disposition and follow-up. Two pediatric emergency medicine physicians applied the 5-item instrument to children presenting in the highest triage category to four rural EDs, and we assessed the reliability of the average summary scores (possible range of 5-35) across the two reviewers using standard measures. We also validated the instrument by comparing this mean summary score between those with and without medication errors (ascertained independently by two pharmacists) using a two-sample t-test. **RESULTS:** We reviewed the medical records of 178 pediatric patients for the study. The mean and median summary score for this cohort of patients were 27.4 and 28.5, respectively. Internal consistency was high (Cronbach's alpha of 0.92 and 0.89). All items showed a significant ($p < 0.005$) positive correlation between reviewers using the Spearman rank correlation (range 0.24 to 0.39). Exact agreement on individual items between reviewers ranged from 70.2% to 85.4%. The Intra-class Correlation Coefficient for the mean of the total summary score across the two reviewers was 0.65. The validity of the instrument was supported by the finding of a higher score for children without medication errors compared to those with medication errors which trended toward significance (mean score = 28.5 vs. 26.0, $p = 0.076$). **CONCLUSION:** The instrument we developed to measure quality of care provided to children in the ED has high internal consistency, fair to good inter-rater reliability and inter-rater correlation, and high content validity. The validity of the instrument is supported by the fact that the instrument's average summary score was lower in the presence of medication errors, which trended towards statistical significance.

Dharmar M, Marcin JP, Romano PS, Andrada ER, Overly F, Valente JH, Harvey DJ, Cole SL, Kuppermann N. Quality of care of children in the emergency department: association with hospital setting and physician training. *J Pediatr* 2008 Jul 9 (Epub ahead of print).

OBJECTIVE: To investigate differences in the quality of emergency care for children related to differences in hospital setting, physician training, and demographic factors. **STUDY DESIGN:** This was a retrospective cohort study of a consecutive sample of children presenting with high-acuity illnesses or injuries at 4 rural non-children's hospitals (RNCHs) and 1 academic urban children's

hospital (UCH). Two of 4 study physicians independently rated quality of care using a validated implicit review instrument. Hierarchical modeling was used to estimate quality of care (scored from 5 to 35) across hospital settings and by physician training. RESULTS: A total of 304 patients presenting to the RNCHs and the UCH were studied. Quality was lower (difference = -3.23; 95% confidence interval [CI] = -4.48 to -1.98) at the RNCHs compared with the UCH. Pediatric emergency medicine (PEM) physicians provided better care than family medicine (FM) physicians and those in the "other" category (difference = -3.34, 95% CI = -5.40 to -1.27 and -3.12, 95% CI = -5.25 to -0.99, respectively). Quality of care did not differ significantly between PEM and general emergency medicine (GEM) physicians in general, or between GEM and PEM physicians at the UCH; however, GEM physicians at the RNCHs provided care of lesser quality than PEM physicians at the UCH (difference = -2.75; 95% CI = -5.40 to -0.05). Older children received better care. CONCLUSIONS: The quality of care provided to children is associated with age, hospital setting, and physician training.

Dieckmann RA, Athey J, Bailey B, Michael J. A pediatric survey for the National Highway Traffic Safety Administration: emergency medical services system re-assessments. *Prehosp Emerg Care*. 2001 Jul-Sep;5(3):231-6.

Emergency medical services for children, or EMSC, is still a relatively underdeveloped component of most state and local EMS systems. Advocacy and funding for EMSC from the federal EMSC Program, availability of many useful EMSC products, and the rapidly enlarging literature in EMSC have created heightened awareness and interest in improving systems for pediatric emergency, trauma, and critical care. The new National Highway Traffic Safety Administration (NHTSA) EMS Technical Assistance (TA) re-assessment program, the second version of the successful original TA Program from 1988 to 1996, provides an ideal opportunity for state EMS professionals to evaluate EMSC capabilities and to integrate new EMSC products and services. The history of the TA Program reflects the evolution of EMS itself and indicates a historical inattention to children's issues, but re-assessment TA teams now have much useful intervening EMSC history to draw upon and a clear philosophical mandate to integrate children more fully in EMS system planning and management. In order to facilitate state-of-the-art reviews of EMSC within state EMS systems, a pediatric survey for the NHTSA re-assessments is presented. The survey, developed with the input of EMS administrators and physicians and approved by the National Association of State EMS Directors, follows the original ten-component model for EMS system review. It is intended for optional use within the overall EMS review process.

Diller E, Vernon D, Dean JM, Suruda A. The epidemiology of pediatric air medical transports in Utah. *Prehosp Emerg Care*. 1999 Jul-Sep;3(3):217-24.

OBJECTIVE: To describe the air-transported patients treated at Primary Children's Medical Center (PCMC), the sole pediatric tertiary care center in Utah and a referral center in the intermountain region. This study describes the patients who utilized the air medical transport system, the medical services provided in the prehospital setting, and the corresponding charges for transport and treatment. **METHODS:** Participants were air-transported patients aged 17 years and less who were treated at PCMC during the calendar years 1991-1992. The study population excluded patients who were transported to other medical facilities, and newborns. Data were abstracted retrospectively from the patients' medical and transport records. Data collected included demographic information, patient diagnoses, and treatments performed during transport. Financial data were supplied by the hospital. **RESULTS:** During the study period, 874 pediatric patients met the participant criteria. Helicopter and fixed-wing transports comprised 561 and 313, respectively, from nine states in the mountain and western regions. The majority (313, 56%) of the patients transported by helicopter were trauma patients, while the majority (195, 62%) of fixed-wing transports were for illness-related conditions. Scene transports accounted for 120 (21%) of helicopter transports. Children with special health care needs accounted for 171 (20%) of all transports. **CONCLUSIONS:** Injury severity scores indicate that, overall, air-transported patients were more severely injured than comparable ground-transported patients. However, it is apparent that some patients who were air-transported could have been transported by ground ambulance without detriment medical services.

Dowd MD, Kennedy C, Knapp JF, Stallbaumer-Rouyer J. Mothers' and health care providers' perspectives on screening for intimate partner violence in a pediatric emergency department. *Arch Pediatr Adolesc Med.* 2002 Aug;156(8):794-9.

OBJECTIVE: To determine the attitudes, feelings, and beliefs of mothers and pediatric emergency department health care providers toward routine intimate partner violence screening. **METHODS:** This qualitative project employed focus groups of mothers who brought their children to a children's hospital emergency department for care, and physicians and nurses who staffed the same department. We held 6 ethnically homogeneous mother focus groups (2 white, 2 African American, and 2 Latina) and 4 provider focus groups (2 predominately female nurse focus groups and 2 physician groups: 1 male and 1 female). Professional moderators conducted the sessions using a semistructured discussion guide. All groups were audiotaped and videotaped, and tapes were reviewed for recurring themes. **RESULTS:** A total of 59 mothers, 21 nurses, and 17 physicians participated. Mothers identified intimate partner violence as a common problem in their communities, and most remarked that routine screening for adult intimate partner violence is an appropriate activity for a pediatric emergency department. However, many expressed concern that willingness to disclose might be affected by a fear of being reported to child protective services. They stressed the importance of addressing the child's health problem first, that screening be done in an empathetic way, and that immediate assistance be available if needed. Themes identified in the provider groups included concerns about time

constraints, fear of offending, and concerns that unless immediate intervention was available, the victim could be placed in jeopardy. Many said they would feel obligated to notify child protective services on disclosure of intimate partner violence. **CONCLUSIONS:** Intimate partner violence screening protocols in the pediatric emergency department should take into consideration the beliefs and attitudes of both those doing the screening and those being screened. Those developing screening protocols for a pediatric emergency department should consider the following: (1) that those assigned to screen must demonstrate empathy, warmth, and a helping attitude; (2) the importance of addressing the child's medical needs first, and a screening process that is minimally disruptive to the emergency department; (3) a defined, organized approach to assessing danger to the child, and how and when it is appropriate to notify child protective services when a caregiver screens positive for intimate partner violence; and (4) that resources must be available immediately to a victim who requests them.

Eckle N, MacLean SL. Assessment of family-centered care policies and practices for pediatric patients in nine US emergency departments. *J Emerg Nurs.* 2001 Jun;27(3):238-45.

INTRODUCTION: Family-centered care recognizes the integral role of the family in the health and well-being of the pediatric patient. However, implementing a family-centered care approach often requires significant philosophical, practice, and environmental changes. A self-assessment inventory of family-centered practices can identify areas for change. **METHODS:** ENA conducted a validation study on an instrument used to assess family-centered care in the emergency department. Nine emergency departments of varying demographics used the Family-centered Care Self-assessment Inventory to evaluate their family-centered care practices. The inventory is organized into 7 sections: (1) vision, mission, and philosophy of care; (2) family support; (3) information and decision making; (4) services coordination and continuity; (5) personnel practices; (6) quality improvement; and (7) community partnerships. Individual and group interviews were completed with a variety of staff in each emergency department. **RESULTS:** All 9 emergency departments demonstrated some integration of family-centered care principles. However, staff knowledge about family-centered care varied. Support of family-centered care was most consistent in the departments with specific competencies, educational programs, and practices that were inclusive of the family. **DISCUSSION:** The Family-centered Care Self-assessment Inventory tool was effective in evaluating family-centered care for pediatric patients in emergency departments. The assessment tool helped the departments to identify current family-centered care practices. Based on those assessments, the departments were able to identify areas of strength and opportunities for improvement in the care of children and their families.

Fiser DH, Tilford JM, Roberson PK. Relationship of illness severity and length of stay to functional outcomes in the pediatric intensive care unit: a multi-institutional study. *Crit Care Med.* 2000 Apr;28(4):1173-9.

OBJECTIVE: The purpose of this study was to establish relationships between illness severity, length of stay, and functional outcomes in the pediatric intensive care unit (PICU) by using multi-institutional data. We hypothesized that a positive relationship exists between functional outcome scores, severity of illness, and length of stay. **DESIGN:** The study used a prospective multicentered inception cohort design. **SETTING:** The study was conducted in 16 PICUs across the United States that were member institutions of the Pediatric Critical Care Study Group of the Society of Critical Care Medicine. **PATIENTS:** In total, 11,106 patients were assessed, representing all admissions to these intensive care units for 12 consecutive months. **MEASUREMENTS:** Functional outcomes were measured by the Pediatric Overall Performance Category (POPC) and Pediatric Cerebral Performance Category (PCPC) scales. Both scales were assessed at baseline and discharge from the PICU. Delta scores were formed by subtracting baseline scores from discharge scores. Other measurements included admission Pediatric Risk of Mortality scores, age, operative status, length of stay in the PICU, and diagnoses. Interrater reliability was assessed by using a set of ten standardized cases on two occasions 6 months apart. **MAIN RESULTS:** Baseline, discharge, and delta POPC and PCPC outcome scores were associated with length of stay in the PICU and with predicted risk of mortality ($p < .01$). Incorporation of baseline functional status in multivariate length of stay analyses improved measured fit. Mild baseline cerebral deficits in children were associated with 18% longer PICU stays after controlling for other patient and institutional characteristics. Moderate and severe baseline deficits for both the POPC and PCPC score predict increased length of stay of between 30% and 40%. On the standardized cases, interrater consensus was achieved on 82% of scores with agreement to within one neighboring class for 99.7% of scores. **CONCLUSIONS:** These data establish current relationships for the POPC and PCPC outcome scales based on multi-institutional data. The reported relationships can be used as reference values for evaluating clinical programs or for clinical outcomes research.

Frush K, Hohenhaus S, Luo X, Gerardi M, Wiebe R. Evaluation of a web-based education program on reducing medication dosing error: a multicenter, randomized controlled trial. *Pediatr Emerg Care.* 2006 Jan;22(1):62-70.

CONTEXT: The Broselow Pediatric Resuscitation Tape has been shown to be effective in reducing medication dosing error among pediatric emergency providers. However, the tape has often been used inappropriately or incorrectly. **OBJECTIVE:** To evaluate whether a Web-based education program on proper use of the tape could reduce medication dosing errors and time to determine dose. **DESIGN, SETTING, AND PARTICIPANTS:** A randomized, controlled trial conducted among 89 pediatric emergency providers from 3 study sites.

INTERVENTION: All study subjects participated in a videotaped simulated stabilization scenario and were then randomly assigned to control or education group. After the intervention, all subjects participated in another simulation.

MAIN OUTCOMES MEASURES: The primary outcomes included dosing deviation from accepted dose range for each medication prescribed and dosing deviation summary, calculated by averaging dosing deviation for all medications. The secondary outcomes included time to determine a dose for each medication prescribed, and dosing time summary; that is, the average time to determine doses for all medications prescribed.

RESULTS: No significant difference was observed in the demographic characteristics of the 2 groups. After the educational intervention, the average (12.6% vs. 24.9%) and median (7.1% vs. 20.1%) dosing deviation summary were much lower in the education group than in the control group. The difference in the median dosing deviation summary between the 2 groups was statistically significant ($P = 0.0002$). Similar results were observed for the dosing time. The education group demonstrated a lower average (16 vs. 20 seconds) and lower median (15 vs. 18 seconds) dosing time summary than the control group. The difference in the median dosing time summary between the 2 groups was statistically significant ($P = 0.02$). Analysis of each medication prescribed indicated that the decrease in the dosing deviation and dosing time in the education group was most obvious for several specific medications.

CONCLUSIONS: The Web-based education program on the proper use of the Broselow Pediatric Resuscitation Tape could improve dosing accuracy and reduce dosing time.

Fuchs S, Lewis RJ. Tools for the measurement of outcome after minor head injury in children: summary from the Ambulatory Pediatric Association/EMSC Outcomes Research Conference. *Acad Emerg Med*. 2003 Apr;10(4):368-75.

This article summarizes discussions held during a conference on outcomes research in emergency medical services for children. It provides detailed information on existing outcome measures for pediatric minor head injury. Benefits and/or limitations in their applicability for use in pediatric emergency medicine and pediatric minor head injury research are highlighted.

Gausche M. Education of prehospital providers in pediatrics. National Task Force studies EMS pediatric care. *JEMS*. 1998 Mar;23(3):74-6.

No abstract available.

Gausche M, Henderson DB, Brownstein D, Foltin GL. The education of out-of-hospital emergency medical personnel in pediatrics: report of a national Task Force. *Prehosp Emerg Care*. 1998 Jan-Mar;2(1):56-61.

No abstract available.

Glaeser PW, Linzer J, Tunik MG, Henderson DP, Ball J. Survey of nationally registered emergency medical services providers: pediatric education. *Ann Emerg Med.* 2000 Jul;36(1):33-8.

STUDY OBJECTIVE: To survey emergency medical services (EMS) providers on a national level to determine and describe their perspective regarding their initial and continuing education (CE) needs in pediatrics. **METHODS:** A 10-question survey was developed, pilot-tested, and sent to EMS providers as a part of their National Registry of Emergency Medical Technicians reregistration materials. **RESULTS:** Surveys were completed by 18,218 EMS providers, a response rate of 67%. During a typical month, 60% of emergency medical technician-paramedics (EMT-Ps), 84% of EMT-intermediates (EMT-Is), and 87% of basic EMTs (EMT-Bs) care for 0 to 3 pediatric patients. CE was identified by all provider levels as the main source of their pediatric knowledge and skills. A state or national mandate for required CE in pediatrics was supported by 76% of surveyed providers. More than 70% of all providers responded they were comfortable to some degree with their own ability and their EMS system's ability when confronted with a critical pediatric call. Cost, availability, and travel distance were identified by all levels as the primary barriers to obtaining pediatric CE. All levels identified infants as the age of greatest concern if the provider was called to manage a critical case. **CONCLUSION:** Surveyed practicing nationally registered EMS providers have infrequent contact with pediatric patients and have acquired most of their pediatric knowledge and skills from CE. In general, these providers are comfortable with their personal and their system's ability to care for children, but clearly support the need for required pediatric CE and identify the birth to 3-year age range as the priority for an educational focus. Cost, travel distance, and availability of pediatric CE are barriers that should be considered if pediatric CE is to be required of EMS providers.

Gorelick MH, Alpern ER, Singh T, Snowdon D, Holubkov R, Dean JM, Kuppermann N, for the Pediatric Emergency Care Applied Research Network (PECARN). Availability of pediatric emergency visit data from existing data sources. *Acad Emerg Med.* 2005 Dec;12(12):1195-200. Epub 2005 Nov 10.

OBJECTIVES: To determine the availability and completeness of selected data elements from administrative and clinical sources for emergency department (ED) visits in a national pediatric research network. **METHODS:** This was a retrospective study of 25 EDs in the Pediatric Emergency Care Applied Research Network. Data were obtained from two sources at each ED: 1) extant electronic administrative data for all visits during a 12-month period in 2002 and 2) data abstracted from medical records by trained abstractors for visits during ten randomly selected days over a three-month period in 2003. Epidemiologic data were obtained for all visits and additional clinical data for patients with two target conditions: asthma and fractures. **RESULTS:** A total of 749,036 visits were analyzed from administrative sources and 12,756 medical records abstracted. Data availability varied by element, method of capture, and site. From administrative

sources, data on insurance type were the most complete (1.3% overall missing; range, 0%-18.5% for individual sites), whereas mode of arrival (25.5% missing) and triage time (65.3%) were the least complete. Disposition was missing in only 1.2% of medical records overall (range, 0%-5%) and diagnosis was missing in 3% (range, 0%-16%); these were missing from 14.4% and 10.5%, respectively, of administrative sources. Among visits with injury diagnoses, E-codes were missing in 27% of cases. For patients with asthma (n = 861), documentation of specific elements of the clinical examination by nurses and physicians was also variable. CONCLUSIONS: Data elements important in emergency medical care for children are frequently missing in existing administrative and medical record sources; completeness varies widely across EDs. Researchers must be aware of these limitations in the use of existing data when planning studies.

Gorelick MH, Atabaki SM, Hoyle JD, Dayan PS, Holmes JF, Holubkov R, Monroe D, Callahan JM, Kuppermann N and PECARN. Interobserver agreement in assessment of clinical variables in children with blunt head trauma. *Acad Emerg Med.* 2008 [In press]

No abstract available.

Gorelick MH, Knight S, Alessandrini EA, Stanley RM, Chamberlain JM, Kuppermann N, Alpern ER, for the Pediatric Emergency Care Applied Research Network (PECARN). Lack of agreement in pediatric emergency visit discharge diagnoses from clinical and administrative data sources. *Acad Emerg Med.* 2007 Jul;14(7):646-52. Epub 2007 Jun 6.

BACKGROUND: Diagnosis information from existing data sources is used commonly for epidemiologic, administrative, and research purposes. The quality of such data for emergency department (ED) visits is unknown. OBJECTIVES: To determine the agreement on final diagnoses between two sources, electronic administrative sources and manually abstracted medical records, for pediatric ED visits, in a multicenter network. METHODS: This was a cross sectional study at 19 EDs nationwide. The authors obtained data from two sources at each ED during a three-month period in 2003: administrative sources for all visits and abstracted records for randomly selected visits during ten days over the study period. Records were matched using unique identifiers and probabilistic linkage. The authors recorded up to three diagnoses from each abstracted medical record and up to ten for the administrative data source. Diagnoses were grouped into 104 groups using a modification of the Clinical Classification System. RESULTS: A total of 8,860 abstracted records had at least one valid diagnosis code (with a total of 12,895 diagnoses) and were successfully matched to records in the administrative source. Overall, 67% (95% confidence interval = 66% to 68%) of diagnoses from the administrative and abstracted sources were within the same diagnosis group. Agreement varied by site, ranging from 54% to 77%. Agreement varied substantially by diagnosis group; there was no difference by method of linkage. Clustering clinically similar diagnosis groups improved agreement between administrative and abstracted data sources. CONCLUSIONS: ED diagnoses retrieved from electronic administrative sources and manual chart

review frequently disagree, even if similar diagnosis codes are grouped. Agreement varies by institution and by diagnosis. Further work is needed to improve the accuracy of diagnosis coding; development of a grouping system specific to pediatric emergency care may be beneficial.

Gregor M, Wheeler J, Stanley R, Mahajan P, Maio R, Piette J. Caregiver adherence to follow-up after an emergency department visit for common pediatric illnesses: impact on future ED use. *Medical Care*, 2008. [In press]

No abstract available.

Grupp-Phelan J, Mahajan P, Foltin G, Jacobs E, Tunik M, Sonnett F, Miller S, Dayan P for the PECARN. Referral and resource utilization patterns for psychiatric related visits to pediatric emergency departments. *Pediatric Emergency Care*. 2008 (in press).

Guice KS, Cassidy L, Mann NC. State trauma registries: survey and update – 2004. *J Trauma*. 2007 Feb;62(2):424-35.

BACKGROUND: This study was undertaken to assess the current status of statewide trauma registries to facilitate a design and plans for a National Trauma Registry for Children. **METHODS:** A telephone survey was administered to state EMS or state trauma registry managers. Summary data for each state was compiled and state EMS or trauma registry managers reviewed the information for accuracy. Survey findings were compared with findings from a similar survey conducted in 1992. **RESULTS:** Thirty-two states reported an active state trauma registry, an increase of seven states since 1992. Thirteen additional states and the District of Columbia are discussing or planning the development of a state trauma registry. One state had a registry but hospitals were not submitting data at the time of this survey. Only four states have no plans to develop a trauma registry. Twenty-nine states with registries require all hospitals to submit data; 15 of these obtain data from trauma centers only. The most commonly reported uses for trauma registry data include advocacy, injury surveillance, education and training, and research. The least commonly reported use is for reimbursement analysis. **CONCLUSION:** Since 1992, progress has been made in developing state trauma registries. Although the concept of a national trauma registry data collection based upon 45 existing state registries, as well as from the District of Columbia, is appealing, concerns about data comparability require resolution. Furthermore, additional work would be required to create a representative sample from which national estimates of injury or outcome could be based.

Guice KS, Cassidy LD, Oldham KT. Traumatic injury and children: a national assessment. *J Trauma*. 2007 Dec;63(6 Suppl):S68-80; discussion S81-6.

Before beginning a study of trauma care for children, it is necessary to understand contemporary injury patterns of children, specifically the volume and types of

injury, injury severity, and institutions where children are hospitalized for trauma. This article was designed to address these issues using the Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID) 2003 that contains over 7 million discharge records from hospitalized children in the United States. Our classification of hospitals into pediatric experience and trauma experience are a first step in better defining what hospital characteristics are important to the optimal care of an injured child. In an era of limited resources, we would like to assure that the right child received the right treatment at the right place.

Han Y, Carcillo J, Dragotta M, et al. Early reversal of pediatric-neonatal septic shock by community physicians is associated with improved outcome. *Pediatrics*. Vol. 112. No. 4. Oct. 2003. pp. 793-799.

Haskell S, Kenney MA, Patel, S, Altenhofen K, Sanddal T, Sanddal NL Atkins DL. Awareness of guidelines of automated external defibrillator use in children within emergency medical services. *Resuscitation* 76:354-359,2008.

Henderson DP, Peckham D. Summer surfing, indoors: The emergency medical services for children (EMSC) web site. *J. Emer Nurs* Vol. 22 Iss 4. pp. 347-349.

Hennes H, Kim MK. Prehospital pain management: current status and future direction. *Clin Pediatric Emerg Med*. 2006;7:25-30.

Despite the recommendations of various professional organizations and evidence on the deleterious effects of untreated pain, inadequate pain management or oligoanalgesia remains a common problem in the prehospital setting. The literature has identified several barriers to adequate prehospital care, and researchers have attempted to address these barriers. Thus far, it appears that education and change in prehospital patient care protocols can improve prehospital pain management. However, there remain too many unanswered questions. The published data on the impact of protocol changes and education did not appear to address all of the identified barriers or address the needs of the pediatric population. In addition, there is pediatric data on appropriate tools for prehospital pain assessment. Finally, there is a dire need to evaluate new and novel analgesic agents that may be delivered via nontraditional routes.

Hohenhaus, S. Pediatric emergency preparedness in schools: A report from the 2001 Southeastern Regional EMSC annual meeting. *Journal of Emergency Nursing*, Volume 27, Issue 4, Pages 353-356. August 2001.

No abstract available.

Hohenhaus S, Lyons E, Phillippi R. Emergency departments and pediatric categorization, approval and recognition: A review of two states. *Journal of Emergency Nursing*. June 2008.

No abstract available.

Horowitz L, Kassam-Adams N, Bergstein J. Mental health aspects of emergency medical services for children: summary of a consensus conference. *J Pediatr Psychol*. 2001 Dec;26(8):491-502.

OBJECTIVE: To address the mental health needs of children involved in emergency medical services (EMS). **METHODS:** A multidisciplinary consensus conference convened to identify mental health needs of children and their families related to pediatric medical emergencies, to examine the impact of psychological aspects of emergencies on recovery and satisfaction with care, and to delineate research questions related to mental health aspects of medical emergencies involving children. **RESULTS:** The consensus group found that psychological and behavioral factors affect physical as well as emotional recovery after medical emergencies. Children's reactions are critically affected by age and developmental level, characteristics of the emergency medical event, and parent reactions. As frontline health care providers, EMS staff members are in a pivotal position to recognize and effectively manage the mental health needs of patients and their families. **CONCLUSIONS:** Ecological changes in emergency departments, such as linkages to mental health follow-up services, training of EMS providers and mental health professionals, and focused research that provides an empirical basis for practice, are necessary components for improving current standards of health care.

Horowitz L, Kassam-Adams N, Bergstein J. Mental health aspects of emergency medical services for children: summary of a consensus conference. *Acad Emerg Med*. 2001 Dec;8(12):1187-96.

OBJECTIVE: To address the mental health needs of children involved in emergency medical services (EMS). **METHODS:** A multidisciplinary consensus conference convened to identify mental health needs of children and their families related to pediatric medical emergencies, to examine the impact of psychological aspects of emergencies on recovery and satisfaction with care, and to delineate research questions related to mental health aspects of medical emergencies involving children. **RESULTS:** The consensus group found that psychological and behavioral factors affect physical as well as emotional recovery after medical emergencies. Children's reactions are critically affected by age and developmental level, characteristics of the emergency medical event, and parent reactions. As frontline health care providers, EMS staff members are in a pivotal position to recognize and effectively manage the mental health needs of patients and their families. **CONCLUSIONS:** Ecological changes in emergency departments, such as linkages to mental health follow-up services, training of EMS providers and mental health professionals, and focused research that provides an empirical basis for practice, are necessary components for improving current standards of health care.

Hoyle JD Jr, White LJ; Emergency Medical Services for Children. Health Resources Services Administration. Maternal and Child Health Bureau. National Association of EMS Physicians. Treatment of pediatric and adolescent mental health emergencies in the United States: current practices, models, barriers, and potential solutions. *Prehosp Emerg Care*. 2003 Jan-Mar;7(1):66-73.

Mental illness significantly impairs the lives of 10% of all children and adolescents in the United States (National Institute of Mental Health. Brief Notes on the Mental Health of Children and Adolescents. Bethesda, MD: National Institute of Mental Health, 1999). Of the myriad mental health problems afflicting children, an alarming number are known to have grim outcomes. Some illnesses continue into adulthood, while others may culminate in death during adolescence. Despite the serious consequences of children's mental health problems, early treatment can improve or control these conditions. Even with this knowledge, seemingly little effort is geared toward removing barriers to treatment for these diseases that plague our children. As a part of its five-year plan, Emergency Medical Services for Children (EMSC) has collaborated with the National Association of EMS Physicians (NAEMSP) to examine childhood and adolescent mental health emergencies--particularly their presentation and management within the emergency medical services system. This document presents a critical review of current practices and models for treatment of children and adolescents that includes identification of barriers to mental health treatment and recommendations for their resolution.

Johnson SB, Bradshaw CP, Wright JL, Haynie DL, Simons-Morton BG, Cheng TL. Characterizing the teachable moment: is an emergency department visit a teachable moment for intervention among assault-injured youth and their parents? *Pediatr Emerg Care*. 2007 Aug;23(8):553-9.

OBJECTIVES: Injury interventions often invoke the teachable moment (TM); however, there is scant empirical research examining this construct with violent injuries. We sought to operationalize the TM construct and to determine whether an emergency department (ED) visit was a TM for intervention among assault-injured adolescents and their parents. **SETTING AND PARTICIPANTS:** One hundred sixty-eight youth (age, 10-15 years) and their parents presenting to the ED with interpersonal assault injuries at 2 urban medical centers. **METHODS AND ANALYSIS:** Data were collected using ED record abstraction and interviews. Interview questions assessed perceived injury severity, perceived susceptibility, and preventability/ability to avoid future conflict. Data were examined by age, sex, weapon involvement, and time elapsed between injury and interview. Factor analysis was used to identify the components of the TM construct, and a TM index was created for youth and parents. **RESULTS:** Youth and parents found their trip to the ED moderately stressful, although parents perceived more stress than youth. Older youth (13-15 years old) and the parents of younger youth (10-12 years old) were most likely to see their injuries as preventable. The parent TM index was positively correlated with parent-reported

aggression ($r = 0.16$, $P < 0.03$); the youth's TM index scores were associated with the time elapsed since the event ($r = -0.16$, $P = 0.03$). CONCLUSIONS: This study provides preliminary support for the TM after assault injuries. The TM index may be a first step toward an assessment that can differentiate individuals who are amenable to violence prevention intervention from those who are not.

Knapp JF, Dowd MD, Kennedy CS, Stallbaumer-Rouyer J, Henderson DP. Evaluation of a curriculum for intimate partner violence screening in a pediatric emergency department. *Pediatrics*. 2006 Jan;117(1):110-6.

OBJECTIVE: We sought to describe the assessment of course participant changes in attitudes, self-efficacy, and behaviors after completion of the Its Time to Ask training curriculum for screening for intimate partner violence (IPV) in a pediatric emergency department (PED). METHODS: A 22-item Likert scale questionnaire was administered at baseline (before training), after training, and at 6-month follow-up to PED employee participants in a 2-hour IPV education program. Mean participant responses were compared between baseline/posttraining and baseline/6-month follow-up. Participants also completed a course-satisfaction survey. RESULTS: A total of 79 PED staff completed the baseline questionnaire before the training. Eighty-seven participants completed the posttraining questionnaire, and 48 completed the 6-month follow-up questionnaire. Participants had consistent, positive changes in attitudes after training that persisted at the 6-month follow-up for 5 items on the questionnaire. Attitudes that did not change showed baseline means already in disagreement with questionnaire statements. Participants reported significant, positive changes for all 7 self-efficacy statements at 1 or both of the posttraining evaluations. The only changes in behavior were observed at 6 months. The majority of participants were satisfied with the training and would recommend it to colleagues. CONCLUSIONS: Significant, self-reported changes in attitudes, self-efficacy, and behaviors/clinical practice regarding screening for IPV in a PED can be achieved through participation in a brief training curriculum.

Lipton H, Coleman M. Bereavement practice guidelines for health care professionals in the emergency department. *Int J Emerg Ment Health*. 2000 Winter;2(1):19-31.

A panel of multidisciplinary experts in the field of emergency services was convened by the National Association of Social Workers in 1999 to develop Bereavement Practice Guidelines. Funded by the Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, this paper discusses the best practices in supporting the family and staff when a child dies suddenly in the Emergency Department. Critical stages ranging from preparation to follow-up are discussed that help to enhance the quality of care provided to the family. A final stage addresses the support needs of staff.

Lipton H, Everly GS Jr. Mental health needs for providers of emergency medical services for children (EMSC): a report of a consensus panel. *Prehosp Emerg Care*. 2002 Jan-Mar;6(1):15-21.

On October 5, 2000, the select Consensus Panel on Mental Health Needs for Providers of Emergency Medical Services for Children (EMSC) was convened in Washington, DC, by the American Psychological Association. This paper reports the results of that two-day meeting. Major topics addressed by the consensus panel were the need for acute psychological support services for providers of EMSC, identification of especially stressful clinical stressors for emergency caregivers, stressors within the health care system, adverse psychological and behavioral reactions among EMSC providers, a review of intervention strategies, and recommendations for future directions. The select panel agreed that there exists an extraordinary need for acute psychological support services in venues that provide EMSC. The panel recommended the proliferation of state-of-the-art information to settings that provide EMSC in order to assist in the implementation of acute psychological support services to assist EMSC providers as well as the pediatric patients and their families. The Critical Incident Stress Management (CISM) crisis intervention program was viewed as one such system of psychological support services that should be pursued.

Lopez AM, Tilford JM, Anand KJ, Jo CH, Green JW, Aitken ME, Fiser DH. Variation in pediatric intensive care therapies and outcomes by race, gender, and insurance status. *Pediatr Crit Care Med*. 2006 Jan;7(1):2-6.

CONTEXT: The differential allocation of medical resources to adult patients according to characteristics such as race, gender, and insurance status raises the serious concern that such issues apply to critically ill children as well. **OBJECTIVE:** This study examined whether medical resources and outcomes for children admitted to pediatric intensive care units differed according to race, gender, or insurance status. **DESIGN:** An observational analysis was conducted with use of prospectively collected data from a multicenter cohort. Data were collected on 5,749 consecutive admissions for children from three pediatric intensive care units located in large urban children's hospitals. **PARTICIPANTS:** Children aged ≤ 18 years admitted over an 18-month period beginning in June 1996 formed the study sample. **MAIN OUTCOME MEASURES:** Hospital mortality, length of hospital stay, and overall resource use were examined in relation to severity of illness. Standardized ratios were formed with generalized regression analyses that included the Pediatric Index of Mortality for risk adjustment. **RESULTS:** After adjustment for differences in illness severity, standardized mortality ratios and overall resource use were similar with regard to race, gender, and insurance status, but uninsured children had significantly shorter lengths of stay in the pediatric intensive care unit. Uninsured children also had significantly greater physiologic derangement on admission (mortality probability, 8.1%; 95% confidence interval [CI], 6.2-10.0) than did publicly insured (3.6%; 95% CI, 3.2-4.0) and commercially insured patients (3.7%; 95%

CI, 3.3-4.1). Consistent with greater physiologic derangement, hospital mortality was higher among uninsured children than insured children. CONCLUSIONS: Risk-adjusted mortality and resource use for critically ill children did not differ according to race, gender, or insurance status. Policies to expand health insurance to children appear more likely to affect physiologic derangement on admission rather than technical quality of care in the pediatric intensive care unit setting.

Mace SE, Brown LA, Francis L, Godwin SA, Hahn SA, Howard PK, Kennedy RM, Mooney DP, Sacchetti AD, Wears RL, Clark RM; EMSC Panel on Critical Issues in the Sedation of Pediatric Patients in the Emergency Department. Clinical policy: critical issues in the sedation of pediatric patients in the emergency department. *J Emerg Nurs.* 2008 Jun;34(3):e33-107.

No abstract available.

Mace SE, Brown LA, Francis L, Godwin SA, Hahn SA, Howard PK, Kennedy RM, Mooney DP, Sacchetti AD, Wears RL, Clark RM; EMSC Panel (Writing Committee) on Critical Issues in the Sedation of Pediatric Patients in the Emergency. Clinical policy: Critical issues in the sedation of pediatric patients in the emergency department. *Ann Emerg Med.* 2008 Apr;51(4):378-99, 399.e1-57.

No abstract available.

MacLean S, Désy P, Juarez A, Perhats C, Gacki-Smith J. Research education needs of pediatric emergency nurses. *J Emerg Nurs.* 2006 Feb;32(1):17-22.

INTRODUCTION: Evidence-based practice in the emergency care of children is critical. The Pediatric Emergency Care Applied Research Network (PECARN) was developed to increase pediatric research; however, participation by emergency nurses has been limited. To identify research needs in order to increase research involvement, the Emergency Nurses Association (ENA) conducted a research needs assessment with nurses in PECARN emergency departments. METHODS: A self-administered needs assessment questionnaire was completed by 216 ED managers and nurses in 26 PECARN emergency departments between August and November of 2004. The questionnaires included items about research education, knowledge, and experience, as well as barriers to and resources for conducting research. Descriptive statistics were used to analyze the data. RESULTS: The primary barriers to nurses' research involvement included limited research knowledge and experience, limited awareness and availability of research resources, lack of dedicated time, and limited recognition for research contributions. However, the nurses reported moderate to extensive interest in research continuing education and desired moderate to extensive involvement in pediatric research. DISCUSSION: The nurses worked in research institutions with increased access to subjects and collaborative opportunities, indicating strong potential for nurses' research involvement. However, few institutions had practice models that included research recognition and dedicated

research time. Furthermore, limited knowledge, experience, and awareness of research resources added to the barriers that reduced research involvement. To begin addressing the barriers, ENA developed a research curriculum based on the continuing education needs and interests identified by the nurses.

Maio RF, Tedeschi P, Swor R, Krohmer J, Ferrel R, Jaques DL. Regional variation of non-rural pediatric ambulance transport rates: an ecological study. *Pediatr Emerg Care*. 1996 Aug;12(4):277-82.

STUDY OBJECTIVE: To determine the relationship of pediatric transport rates per hundred thousand pediatric population (RATE) to socioeconomic status (SES) factors and also mortality in Emergency Medical Services (EMS) systems. **DESIGN:** Retrospective ecological study. **SETTING:** Four EMS Medical Control Authorities (MCAs) in Michigan. **PARTICIPANTS:** Patients (3,792), 0-19 years of age, responded to as a nonscheduled emergency response and transported to a hospital by ambulance. **METHODS AND MEASUREMENTS:** RATE, economic status (INCOME), private transportation status (VEHICLE), educational status (EDUC), primary care physician availability (PHYS), and EMS disease death rate (EMSDD) were determined for each MCA and analyzed using Spearman rank correlation. **RESULTS:** RATE between MCAs varied from 325 to 750. RATE was highest in the most urban MCA: its 0-4 RATE was fourfold larger than any other MCA. INCOME, EDUC, and VEHICLE were inversely correlated with transport rate: -1.00, -1.00, -1.00; $P < 0.001$. Rate was positively correlated with EMSDD: 1.00; $P < 0.001$. **CONCLUSIONS:** Substantial variation in RATE between MCAs may be primarily due to the high 0-4 transport rate in the most urban MCA. This study also suggests that higher pediatric EMS system utilization rates may be correlated to higher mortality and also to unavailability of personal transportation.

Mann NC, Dean JM, Mobasher H, Mears G, Ely M. The use of national highway traffic safety administration uniform prehospital data elements in state emergency medical services data collection systems. *Prehosp Emerg Care*. 2004 Jan-Mar;8(1):29-33.

OBJECTIVE: Although the concept of emergency medical services (EMS) has existed for 30 years, there is little scientific evidence validating its impact on morbidity and mortality. A significant barrier to conducting meaningful assessments relates to the lack of reliable and uniform EMS data. The objective of this study was to determine the extent to which states incorporate the Uniform Prehospital EMS Data Elements into statewide EMS data collection systems. **METHODS:** Study investigators requested and compared data elements from all states with a statewide prehospital data collection system. **RESULTS:** During the study period, 43 states with statewide EMS data collection systems captured, on average, 79% of the Uniform Prehospital EMS Data Set. Variables considered essential to EMS evaluation were more likely collected (84%) than variables considered desirable (72%). Only eight (10%) of the 81 uniform data elements are collected by all 43 participating states. **CONCLUSIONS:** Findings suggest that

related EMS data variables are collected by the majority of states across the country. This degree of similarity provides a foundation for establishing common fields that can be used to develop a national EMS registry.

Mann NC, Guice K, Cassidy L, Wright D, Koury J. Are statewide trauma registries comparable? Reaching for a national trauma dataset. *Acad Emerg Med.* 2006 Sep;13(9):946-53. Epub 2006 Aug 10.

BACKGROUND: Statewide trauma registries have proliferated in the last decade, suggesting that information could be aggregated to provide an accurate depiction of serious injury in the United States. **OBJECTIVES:** To determine whether variability exists in the composition and content of statewide trauma registries, specifically addressing case-acquisition, case-definition (inclusion criteria), and registry-coding conventions. **METHODS:** A cross-sectional, two-part survey was administered to managers of all statewide trauma registries. State trauma registrars also provided inclusion and exclusion criteria from their state registry and abstracted a clinical vignette designed to identify coding inconsistencies. **RESULTS:** Thirty-two states maintain a centralized registry, but requirements for data submission vary significantly. Inclusion and exclusion criteria also vary, particularly for nontraumatic injuries. Coding conventions adopted by states for vague or missing information are dissimilar. When abstractions of the clinical vignette are compared, only 19% and 47% of states provided similar quantity or content for injury e-coding and diagnostic coding, respectively. Injury severity scores (based on diagnostic coding) demonstrated a range from 2 to 18. **CONCLUSIONS:** Statewide trauma registries are prevalent but vary significantly in composition and content. Standardizing inclusion criteria, variable definitions, and coding conventions would greatly enhance the usability of an aggregated, national trauma registry.

Marcin JP, Dharmar M, Cho Meyng, Seifert L, Cook JL, Cole SL, Romano PS. Medication errors among acutely ill and injured children treated in rural emergency departments. *Ann Emerg Med.* 2007 Oct;50(4):361-7, 367.e1-2. Epub 2007 Apr 11.

STUDY OBJECTIVE: We identify the incidence, nature, and consequences of medication errors among acutely ill and injured children receiving care in a sample of rural emergency departments (EDs). **METHODS:** Two pediatric pharmacists applied a medication error data collection instrument to the medical records of all critically ill children (highest triage category) treated in 4 northern California rural EDs between January 2000 and June 2003. Physician-related medication errors were defined as those involving wrong dose, wrong or inappropriate medication for condition, wrong route, or wrong dosage form. Wrong dose was determined by preset criteria, with doses above or below 10% to 25% of correct dose considered errors, depending on class of medication. Medication errors were classified into categories A through I under 3 broader categories, including errors having the potential to cause harm (A), errors that cause no harm (B to D), and errors that cause harm to the patient (E to I).

RESULTS: Complete data were available from 177 (97.3%) of the 182 patients identified as having been triaged in the highest category during the study period. A total of 84 medication errors were identified among 69 patients, resulting in a medication error incidence of 39.0%. Twenty-four physician-related medication errors were identified among 21 patients, resulting in a physician-related medication error incidence of 11.9%. Among the 69 patients with medication errors, 11 had errors categorized as having the potential to cause harm (15.9%), and 58 had errors categorized as causing no harm (85.5%). CONCLUSION: We found a high incidence of medication errors and physician-related medication errors among the acutely ill and injured children presenting to rural EDs in northern California. None of the medication errors identified caused harm to the patients included in this study.

Markenson D, Foltin G, Tunik M, Cooper A, Matza-Haughton H, Olson L, Treiber M; Center for Pediatric Emergency Medicine; National Registry of Emergency Medical Technicians; National EMSC Data Resource Center. Knowledge and attitude assessment and education of prehospital personnel in child abuse and neglect: report of a National Blue Ribbon Panel. *Prehosp Emerg Care*. 2002 Jul-Sep;6(3):261-72.

No abstract available.

Markenson D, Foltin G, Tunik M, Cooper A, Matza-Haughton H, Olson L, Treiber M; Center for Pediatric Emergency Medicine; National Registry of Emergency Medical Technicians; National EMSC Data Resource Center. Knowledge and attitude assessment and education of prehospital personnel in child abuse and neglect: report of a National Blue Ribbon Panel. *Ann Emerg Med*. 2002 Jul;40(1):89-101.

No abstract available.

Markenson D, Foltin G, Tunik M, Cooper A, Matza-Haughton H, Olson L, Treiber M; Center for Pediatric Emergency Medicine; National Registry of Emergency Medical Technicians; National EMSC Data Resource Center. Knowledge and attitude assessment and education of prehospital personnel in child abuse and neglect: report of a National Blue Ribbon Panel. *Pediatr Emerg Care*. 2002 Jun;18(3):238-46.

No abstract available.

Markenson D, Redlener I. Pediatric terrorism preparedness national guidelines and recommendations: findings of an evidenced-based consensus process. *Biosecur Bioterror*. 2004;2(4):301-19.

A cadre of experts and stakeholders from government agencies, professional organizations, emergency medicine and response, pediatrics, mental health, and disaster preparedness were gathered to review and summarize the existing data on the needs of children in the planning, preparation, and response to disasters or terrorism. This review was followed by development of evidence-based consensus

guidelines and recommendations on the needs of children in disasters, including chemical, biological, and radiological terrorism. An evidence-based consensus process was used in conjunction with a modified Delphi approach for selection of topic areas and discussion points. These recommendations and guidelines represent the first national evidence-based standards for pediatric disaster and terrorism preparedness.

Mears G, Ornato JP, Dawson DE. Emergency medical services information systems and a future EMS national database. *Prehosp Emerg Care*. 2002 Jan-Mar;6(1):123-30.

Since the early 1970s, various publications and legislation have contributed to the development of emergency medical services (EMS) information systems and databases. Yet, even today, EMS systems vary in their ability to collect patient and systems data and to put these data to use. In addition, no means currently exists to easily link disparate EMS databases to allow analysis at local, state, and national levels. For this reason, the National Association of State EMS Directors is working with its federal partners at the National Highway Traffic Safety Administration (NHTSA) and the Trauma and EMS program of the Health Resources and Services Administration's (HRSA's) Maternal and Child Health Bureau to develop a national EMS database. Such a database would be useful in developing nationwide EMS training curricula, evaluating patient and EMS system outcomes, facilitating research efforts, determining national fee schedules and reimbursement rates, and providing valuable information on other issues related to EMS care.

Middleton KR, Burt CW. Availability of pediatric services and equipment in emergency departments: United States, 2002–03. *Adv Data*. 2006 Feb 28;(367):1-16.

OBJECTIVES: This report presents estimates on the availability of pediatric services, expertise, and supplies for treating pediatric emergencies in U.S. hospitals. **METHODS:** The Emergency Pediatric Services and Equipment Supplement (EPSES) was a self-administered questionnaire added to the 2002-03 National Hospital Ambulatory Medical Care Survey (NHAMCS). NHAMCS samples non-Federal, short-stay and general hospitals in the United States. The EPSES content was based on the 2001 guidelines for pediatric services, medical expertise, small-sized supplies, and equipment for emergency departments (EDs) developed by the American Academy of Pediatrics (AAP) and the American College of Emergency Physicians (ACEP). Combined response rate for both years was 86 percent. Estimates were weighted to produce average annual estimates of pediatric services, expertise, and equipment availability in EDs. **RESULTS:** One-half of hospitals (52.9 percent) admitted pediatric patients, but did not have a specialized inpatient pediatric ward. One-third (38.3 percent) admitted pediatric patients and had a separate pediatric ward; the remainder did not admit pediatric patients. Among those that did not admit pediatric cases, 30.4 percent were in counties that had a children's hospital. One-quarter of EDs had access 24 hours

and 7 days a week to a board-certified pediatric emergency medicine attending physician. Only 5.5 percent had all recommended pediatric supplies, but one-half had greater than 85 percent of recommended supplies. Most hospitals without pediatric trauma service (90.7 percent) or pediatric intensive care units (97.5 percent) transferred critical pediatric patients to hospitals with these services. EDs in hospitals with specialized inpatient facilities for children were more likely to meet the AAP and ACEP guidelines for pediatric ED services, expertise, and supplies.

Miller SZ, Rincón H, Kuppermann N; Pediatric Emergency Care Applied Research Network. Revisiting the Emergency Medicine Services for Children Research Agenda: Priorities for Multicenter Research in Pediatric Emergency Care. *Acad Emerg Med.* 2008 Apr;15(4):377-83.

OBJECTIVES: To describe the creation of an Emergency Medical Services for Children (EMSC) research agenda specific to multicenter research. Given the need for multicenter research in EMSC and the unique opportunity afforded by the creation of the Pediatric Emergency Care Applied Research Network (PECARN), the authors revisited existing EMSC research agendas to develop a PECARN-specific research agenda. They sought to prioritize PECARN research efforts, to guide investigators planning to conduct research in PECARN, and to describe the creation of a prioritized EMSC research agenda specific for multicenter research. **METHODS:** The authors used the Nominal Group Process and Hanlon Process of Prioritization (HPP), which are recognized research prioritization methods incorporating both quantitative and qualitative data collection in group settings. The formula used to generate the final priority list heavily weighted practicality of conduct in a multicenter research network. By using size, seriousness, and practicality measures of each health priority, PECARN was able to identify factors that could be scored individually and were weighted relative to each other. **RESULTS:** The prioritization processes resulted in a ranked list of 16 multicenter EMSC research topics. Top among these priorities were 1) respiratory illnesses/asthma, 2) prediction rules for high-stakes/low-likelihood diseases, 3) medication error reduction, 4) injury prevention, and 5) urgency and acuity scaling. **CONCLUSIONS:** The PECARN prioritization process identified high-priority EMSC research topics specific to multicenter research. PECARN has the capacity to answer long-standing, important clinical controversies in EMSC, largely due to its ability to conduct randomized controlled trials and observational studies on a large scale.

Moody-Williams JD, Athey J. Emergency Medical Services for Children managed care white paper series: Introduction. *Ann Emerg Med.* 1999 Dec;34(6):751-2.

The introduction of managed care principles profoundly changed the delivery of health care in the United States. The Emergency Medical Services for Children (EMSC) program has developed a series of white papers to address the impact of managed care on the emergency care system for children and adolescents. We

hope that these white papers will focus discussions among managed care organizations, health care providers, and the public in ways that will lead to improvement in the system of care available to children and adolescents.

Moody-Williams JD, Linzer J, Stern A, Wilkinson J, Athey J. Twenty-four-hour access to emergency care for children in managed care. *Ann Emerg Med.* 1999 Dec;34(6):761-7.

Children's medical emergencies occur around the clock. In years past, the emergency department, open 24 hours a day, was a familiar site for treating these emergencies. However, in today's health care environment, the scenario can be more confusing. As many families move from a fee-for-service system into a managed care organization (MCO), they may be unclear about what they should do in an emergency involving their child. MCOs want to provide appropriate care, and at the same time, operate within a system designed to contain costs through the establishment of effective health care delivery systems. Providers of emergency services, including specialists in pediatric medicine and emergency medical services responders, also must contend with a different set of problems, including administrative entanglements and concerns about reimbursement for their services. This article continues the white paper series by the Emergency Medical Services for Children Managed Care Task Force.

Moody-Williams JD, Athey J, Barlow B, Blanton D, Garrison H, Mickalide A, Miller T, Olson L, Skripak D. Injury prevention and emergency medical services for children in a managed care environment. *Ann Emerg Med.* 2000 Mar;35(3):245-51.

Each year, 1 in 5 US children receives medical care as a result of injury. Injuries are the leading cause of medical spending for children ages 5 to 21 years, accounting for more than 20% of hospital admissions and days spent in the hospital. Pediatric injuries become an important issue for managed care organizations because of concern for member safety and increasing medical costs related to treatment. Because effective prevention decreases health care consumption, injury prevention often costs less than treating injuries. Simple devices, such as bicycle helmets, smoke detectors, and child safety seats, help keep children safe and save money. Appropriate emergency care at the scene of an injury, poison control centers that dispense expert advice over the telephone, and triaged regional trauma systems improve the outcome and save money at the same time. This article continues the white paper series by the Emergency Medical Services for Children Managed Care Task Force.

Moody-Williams JD, Dawson D, Miller DR, Schafermeyer RW, Wright J, Athey J. Quality and accountability: Children's emergency services in a managed care environment. *Ann Emerg Med.* 1999 Dec;34(6):753-60.

The fast pace of change in the health care system has sparked growing interest among purchasers, consumers, providers, health plans, and others in evaluating and improving the quality of health services. The Emergency Medical Services

for Children Program's Managed Care Task Force recommended the development of a white paper to focus on issues related to quality and accountability in children's emergency medical services in a managed care environment. A literature review was conducted, and a panel reviewed and discussed relevant materials. The panelists then developed recommendations as a resource for managed care organizations, providers of care, professional associations, and federal, state, and local policymakers.

Moody-Williams JD, Krug S, O'Connor R, Shook JE, Athey JL, Holleran RS. Practice guidelines and performance measures in emergency medical services for children. *Ann Emerg Med.* 2002 Apr;39(4):404-12.

Practice guidelines and performance measures are critical elements of an effective quality improvement process for emergency medical services for children (EMSC). Practice guidelines address the clinical management of individual patients, and performance measures assess the quality of care delivered to a population. The public and private sectors have invested considerable resources in developing practice guidelines and performance measures to improve the quality of health care services. As organizations continue development efforts, health care professionals who are actively involved in emergency care must collaborate to develop guidelines that address the unique physiologic, psychologic, and cultural needs of children. The Emergency Medical Services for Children Managed Care Task Force recommended the development of a series of white papers to focus on issues related to practice guidelines and performance measures in EMSC. The Maternal and Child Health Bureau, Health Resources and Services Administration, the National Highway Traffic Safety Administration, and the Robert Wood Johnson Foundation jointly sponsored the project. The paper was developed by a panel selected from a pool of experts in managed care, quality improvement, and emergency medical services. After a review of the literature, the panelists met to discuss critical issues related to practice guidelines and performance measures in EMSC. The panelists developed recommendations that can serve as resources for managed care organizations, health care providers, professional associations, and governmental policy makers. The panel recognized the lack of nationally recognized pediatric emergency care guidelines and performance measures and called for immediate action in these areas.

Mulligan-Smith D, O'Connor RE, Markenson D. EMSC partnership for children: National Association of EMS Physicians model pediatric protocols. *Prehospital Emergency Care.* Vol. 4, Issue. 2, April-June 2000. pp 111-130.

[No authors listed]

Guidelines for pediatric equipment and supplies for basic and advanced life support ambulances. Committee on Ambulance Equipment and Supplies, National Emergency Medical Services for Children Resource Alliance. *Prehosp Emerg Care.* 1997 Oct-Dec;1(4):286-7.

No abstract available.

[No authors listed]

Guidelines for pediatric equipment and supplies for basic and advanced life support ambulances. Committee on Ambulance Equipment and Supplies, National Emergency Medical Services for Children Resource Alliance. *Pediatr Emerg Care*. 1996 Dec;12(6):452-3.

No abstract available.

[No authors listed]

Guidelines for pediatric equipment and supplies for basic and advanced life support ambulances. Committee on Ambulance Equipment and Supplies, National Emergency Medical Services for Children Resource Alliance. *Ann Emerg Med*. 1996 Dec;28(6):699-701.

No abstract available.

[No authors listed]

Guidelines for pediatric equipment and supplies for emergency departments. Committee on Pediatric Equipment and Supplies for Emergency Departments, National Emergency Medical Services for Children Resource Alliance. *Pediatr Emerg Care*. 1998 Feb;14(1):62-4.

Appropriate care for ill and injured pediatric patients cannot be given if emergency departments (EDs) are not adequately equipped. Although guidelines for equipment and supplies for EDs have been published by national organizations in pediatric emergency textbooks and by state emergency medical services for children projects, until now there has been no consensus on what constitutes minimum equipment and supplies to care for pediatric patients in the ED setting.

[No authors listed]

Guidelines for pediatric equipment and supplies for emergency departments. Committee on Pediatric Equipment and Supplies for Emergency. *Ann Emerg Med*. 1998 Jan;31(1):54-7.

No abstract available.

[No authors listed]

Improving emergency medical services for children through outcomes research: an interdisciplinary approach. *Ambul Pediatr*. 2002 Jul-Aug;2(4 Suppl):285-348.

Proceedings of a conference.

[No authors listed]

Emergency Medical Services for Children, National Task Force on Children With Special Health Care Needs: EMS for children: Recommendations for coordinating care for children with special health care needs. *Ann Emerg Med.* 1997 Sep;30(3):274-80.

STUDY OBJECTIVE: To address the need for coordinated care for children and their families during the acute care phase of their hospitalization. **METHODS:** A multidiscipline task force developed this concept paper through a consensus process. The process was coordinated by the Emergency Medical Services for Children Program (a program of the Health Resources and Services Administration and the National Highway Traffic Safety Administration). The task force included representatives from prehospital care, acute care, rehabilitation, primary care, and education, as well as consumers. This representation provided a broad perspective on the needs of children and their families in the transition from hospital care to home. **CONCLUSION:** One designated individual is essential during the acute care phase who can assist the family with gaining information and resources to ensure a successful transition to community services and resources. This article provides a framework for acute care facilities and providers to use in planning services and working with acutely ill and injured children. Several recommendations highlight the need for care coordination to be initiated early in the child's hospitalization. An overview of services and resources (both health and educational) that a child and family may need is also provided. Such services and resources include identifying a care coordinator, working with the family to identify a primary care provider before hospital discharge, and building bridges with community-based health and education services.

[No authors listed]

Education of out-of-hospital emergency medical personnel in pediatrics: report of a National Task Force. *Ann Emerg Med.* 1998 Jan;31(1):58-64.

The Pediatric Education Task Force has developed a list of major topics and skills for inclusion in pediatric curricula for EMS providers. Areas of controversy in the management of pediatric patients in the prehospital setting are outlined, and helpful learning tools are identified.

Pediatrics Committee and National Association of EMS Physicians. EMSC partnership for children: National Association of EMS Physicians model pediatric protocols, 2003 Revision. *Prehospital Emergency Care.* Vol. 8. Issue 4. October-December 2004. pp. 343-365.

The Pediatric Emergency Care Applied Research Network. The Pediatric Emergency Care Applied Research Network (PECARN): Rationale, Development, and First Steps. *Acad Emerg Med.* 2003 Jun;10(6):661-8.

Since its formal recognition as a medical specialty, the field of pediatric emergency medicine has made substantial advances with respect to its scope and

sophistication. These advances have occurred in clinical practice as well as in the research base to improve clinical practice. There remain, however, many areas in emergency medical services for children (EMSC), in the out-of-hospital as well as the emergency department (ED) and hospital settings, that suffer from a lack of data to guide practice. In an effort to expand the quality and quantity of research in pediatric emergency care, the Pediatric Emergency Care Applied Research Network (PECARN) was created in October 2001. PECARN is the first federally funded national network for research in EMSC. PECARN is the result of Cooperative Agreement grants funded through the Health Resources and Services Administration (HRSA) with the purpose of developing an infrastructure capable of overcoming inherent barriers to pediatric EMSC research. Among these recognized barriers are low incidence rates of serious pediatric emergency events, the need for large numbers of children from varied backgrounds to achieve broadly representative study samples, lack of an infrastructure to test the efficacy of pediatric emergency care, and the need for a mechanism to translate study results into clinical practice. PECARN will serve as a national platform for collaborative research involving the continuum of care within the EMSC system, including out-of-hospital care, patient transport, ED and in-hospital care, and rehabilitation. This article describes the history of EMSC, the need for a national collaborative research network in EMSC, the organization and development of PECARN, and the work plan for the Network.

The Pediatric Emergency Care Applied Research Network. The Pediatric Emergency Care Applied Research Network (PECARN): Rationale, Development, and First Steps. *Pediatr Emerg Care*. 2003 Jun;19(3):185-93.

Since its formal recognition as a medical specialty, the field of pediatric emergency medicine has made substantial advances with respect to its scope and sophistication. These advances have occurred in clinical practice as well as in the research base to improve clinical practice. There remain, however, many areas in emergency medical services for children (EMSC) in the out-of-hospital, emergency department (ED), and hospital settings that suffer from a lack of data to guide practice. In an effort to expand the quality and quantity of research in pediatric emergency care, the Pediatric Emergency Care Applied Research Network (PECARN) was created in October of 2001. PECARN is the first federally funded national network for research in EMSC and is the result of cooperative agreement grants funded through the Health Resources and Services Administration with the purpose of developing an infrastructure capable of overcoming inherent barriers to EMSC research. Among these recognized barriers are low incidence rates of serious pediatric emergency events, the need for large numbers of children from varied backgrounds to achieve broadly representative study samples, lack of an infrastructure to test the efficacy of pediatric emergency care, and the need for a mechanism to translate study results into clinical practice. PECARN will serve as a national platform for collaborative research involving the continuum of care within the EMSC system, including out-of-hospital care, patient transport, ED and in-hospital care, and rehabilitation. This article

describes the history of EMSC, the need for a national collaborative research network in EMSC, the organization and development of PECARN, and the work plan for the network.

Pyles LA, Hines C, Patock M, Schied M, Chase J, Jamrozek K, Schiff JS. Development of a web-based database to manage American College of Emergency Physicians/American Academy of Pediatrics Emergency Information Forms. *Acad Emerg Med*. 2005 Mar;12(3):257-61.

Children with special health care needs require special advanced planning for their unique emergencies. A Web site has been developed to allow secure Internet access to a database of Emergency Information Forms developed using the American College of Emergency Physicians/ American Academy of Pediatrics format. The content and organization of the Web site, found at <http://www.memscis.org>, are described. A tour of the site is available. A set of XML data elements has been defined. Additional disaster preparedness elements have been added to the American College of Emergency Physicians/American Academy of Pediatrics Emergency Information Forms. The organization, security, and relationship of the site to electronic health records are described.

Quan L, Bennett E, Cummings P, Henderson P, Del Beccaro M. Do parents value drowning prevention information at discharge from the emergency department? *Ann Emergency Med*. Vol. 37, Iss. 4, pp. 382-385.

Rossano JW, Quan L, Kenney MA, Rea TD, Atkins DL. Energy doses for treatment of out-of-hospital pediatric ventricular fibrillation. *Resuscitation*. 2006 Jul;70(1):80-9. Epub 2006 Jun 8.

AIM: To investigate the energy dose used to treat out-of-hospital pediatric ventricular fibrillation and the survival rates of these patients. METHODS: We reviewed three emergency medical systems (EMS) for their reports of patients under 1 month to 18 years who received shocks for ventricular fibrillation to determine the energy of each shock as well as other patient and care characteristics. Each patient's weight was estimated at the age-appropriate 50th and 95th percentiles. Patients were then grouped as receiving recommended energy doses (2 to \leq 4 J/kg), moderately high energy doses ($>$ 4-6 J/kg), and high energy doses ($>$ 6 J/kg). RESULTS: Of 57 patients identified, 54% were male, with a mean age of 11 years, range 2 months to 17 years. Ventricular fibrillation was the initial rhythm in 80% (43/54) of patients. The mean number of shocks delivered was 3, with \leq 2 shocks delivered to 28 (49%) and \geq 5 shocks delivered to 10 (18%) patients. When evaluating all 185 shocks using the 50th percentile estimated weight, 45 (24%) shocks were at recommended doses, 56 (30%) were at moderately high energy doses, and 84 (45%) were high energy doses. Elevated energy dose was associated with an increasing number of shocks and lack of bystander CPR ($p < .05$). Nineteen (33%) patients survived to hospital discharge having received total doses up to 73 J/kg. Energy dose was not related

to survival. CONCLUSION: In this observational, multicenter out of hospital experience, children received a wide range of defibrillation doses, often exceeding recommended doses and equivalent to adult energy levels. Survival occurred at low and very high energy doses.

Seidel J, Tittle S, Hodge D 3rd, Garcia V, Sabato K, Gausche M, Scherer LR, Gerardi M, Baker MD, Weber S, Iakahashi I, Boechler E, Jalalon S. Guidelines for pediatric equipment and supplies for emergency departments. Committee on Pediatric Equipment and Supplies for Emergency Departments. National Emergency Medical Services for Children Resource Alliance. *J Emerg Nurs*. 1998 Feb;24(1):45-8.

No abstract available.

Seidel JS, Henderson D, Tittle S, Jaffe D, Spaite D, Dean JM, Gausche M, Lewis RJ, Cooper A, Zaritsky A, Espisito T, Maederis D. Priorities for research in emergency medical services for children: results of a consensus conference. *Pediatr Emerg Care*. 1999 Feb;15(1):55-8.

Emergency Medical Services for Children (EMSC) Research Agenda Consensus Committee, National EMSC Resource Alliance, Harbor-UCLA Research and Education Institute, UCLA School of Medicine, Torrance, California, USA. OBJECTIVE: To arrive at a consensus on the priorities for future research in emergency medical services for children. METHODS: A consensus group was convened using the Rand-UCLA Consensus Process. The group took part in a 3-phase process. Round I involved reviewing a compendium of relevant research articles and answering a mailed questionnaire. Panel members were asked to prioritize topics on the basis of the 1993 Institute of Medicine Report on Emergency Medical Services for Children. Participants were asked to rate each topic based on the significance of the research, and whether the topic would (1) improve general knowledge (2), change behavior (3), improve health (4), decrease the cost of care, or (5) change public policy. A 4-point Likert scale was used. Participants were also asked if the research would require a multicenter study and if the research were feasible. Round II of the study involved a meeting of the panel, where the results of Round I were discussed and the topics were reprioritized. The topics were given a rank order and a final ranking was done in Round III. RESULTS: The panel considered a list of 32 topics; these were combined and reworded to give them more precise meaning. Several new topics were also added. Fifteen topics were given a rank order and placed within the 7 broad categories of the Institute of Medicine report. Clinical aspects of emergency care, systems organization, configuration, and operation and injury prevention were given high priority rankings. The first 5 topics were very close in point-rank order. CONCLUSION: The panel was able to develop a list of important topics for future research in emergency medical services for children that can be used by foundations, governmental agencies, and others in setting research agenda for such services.

Seidel JS, Henderson D, Tittle S, Jaffe D, Spaite D, Dean JM, Gausche M, Lewis RJ, Cooper A, Zaritsky A, Espisito T, Maederis D. Priorities for research in Emergency Medical Services for Children: results of a consensus conference. EMSC Research Agenda Consensus Committee, National EMSC Resource Alliance. *J Emerg Nurs.* 1999 Feb;25(1):12-6.

STUDY OBJECTIVE: The study objective was to arrive at a consensus on the priorities for future research in Emergency Medical Services for Children (EMSC). **METHODS:** A consensus group was convened using the Rand-UCLA Consensus Process. The group took part in a 3-phase process. Phase I involved reviewing a compendium of relevant research articles and answering a mailed questionnaire. Panel members were asked to prioritize topics based on the 1993 Institute of Medicine Report on Emergency Medical Services for Children. Participants were asked to rate each topic based on the significance of the research and whether the topic would (1) improve general knowledge, (2) change behavior, (3) improve health, (4) decrease the cost of care, or (5) change public policy. A 4-point Likert scale was used. They were also asked in the research would require a multicenter study and if the research were feasible. Round II of the study involved a meeting of the panel, where the results of Round I were discussed and the topics reprioritized. The topics were given a rank order and a final ranking was done in Round III. **RESULTS:** The panel considered a list of 32 topics and these were combined and reworded to give them more precise meaning. Several new topics were also added. Fifteen topics were given a rank order and placed within the 7 broad categories of the Institute of Medicine report. Clinical aspects of emergency care systems organization, configuration and operation and injury prevention were given high priority rankings. The first 5 topics were very close in point-rank order. **CONCLUSION:** The panel was able to develop a list of important topics for future research in EMSC that can be used by foundations, governmental agencies, and others in setting a research agenda for EMSC.

Seidel JS, Henderson D, Tittle S, Jaffe DM, Spaite D, Dean JM, Gausche M, Lewis RJ, Cooper A, Zaritsky A, Espisito T, Maederis D. Priorities for research in emergency medical services for children: results of a consensus conference. *Ann Emerg Med.* 1999 Feb;33(2):206-10.

STUDY OBJECTIVE: To arrive at a consensus on the priorities for future research in emergency medical services for children. **METHODS:** A consensus group was convened using the Rand-UCLA Consensus Process. The group took part in a 3-phase process. Round 1 involved reviewing a compendium of relevant research articles and answering a mailed questionnaire. Panel members were asked to prioritize topics on the basis of the 1993 Institute of Medicine Report on Emergency Medical Services for Children. Participants were asked to rate each topic based on the significance of the research, and whether the topic would (1) improve general knowledge, (2) change behavior, (3) improve health, (4) decrease the cost of care, or (5) change public policy. A 4-point Likert scale was used.

Participants were also asked if the research would require a multicenter study and if the research were feasible. Round 2 of the study involved a meeting of the panel, where the results of Round 1 were discussed and the topics were reprioritized. The topics were given a rank order and a final ranking was done in Round 3. RESULTS: The panel considered a list of 32 topics; these were combined and reworded to give them more precise meaning. Several new topics were also added. Fifteen topics were given a rank order and placed within the 7 broad categories of the Institute of Medicine report. Clinical aspects of emergency care, systems organization, configuration, and operation and injury prevention were given high priority rankings. The first 5 topics were very close in point-rank order. CONCLUSION: The panel was able to develop a list of important topics for future research in emergency medical services for children that can be used by foundations, governmental agencies, and others in setting a research agenda for such services.

Singh T, Wright JL, Adirim TA. Children with special health care needs: a template for prehospital protocol development. *Prehosp Emerg Care*. 2003 Jul-Sep;7(3):336-51.

There are 12 million children in the United States with special health care needs. Improvements in medical technology, managed care, and changing social views about the institutionalization of children have all contributed to an increasing number of children with special health care needs (CSHCN) residing primarily in their home communities. Because of the dynamic and fragile nature of the medical conditions typically borne by CSHCN, the need for emergency care is not uncommon and prehospital providers are increasingly likely to encounter this population. Few states have initiated emergency medical services (EMS) protocols addressing field assessment, management, and stabilization of CSHCN and existing model protocols have not yet incorporated a distinct CSHCN component. With the support of grant funding from the federal Emergency Medical Services for Children (EMSC) program, a project was undertaken by investigators in the Center for Prehospital Pediatrics at Children's National Medical Center to develop prehospital protocols for CSHCN. This report details the protocol development process, discusses suggestions for their use, and presents the detailed protocols. The protocols are intended to serve as a resource template for the development and/or revision of jurisdiction-specific, customized practice guidelines.

Solomon BS, Bradshaw CP, Wright J, Cheng TL. Youth and parental attitudes toward fighting. *J Interpers Violence*. 2008 Apr;23(4):544-60. Epub 2008 Feb 14.

Certain parenting behaviors have been linked with youth aggression and violence, but less is known about whether parents' attitudes toward fighting are a risk factor for children's aggressive behavior problems and future injury risk. Social cognitive theory suggests that parents' beliefs about fighting and retaliation may influence their children's attitudes toward fighting and aggression. The authors examined the associations among parental and youth attitudes toward fighting,

parent-child relationships, and youth aggressive behavior in adolescents at great risk for future interpersonal violence. Data came from 72 parents and their adolescents (aged 12 to 17 years, 89% African American), who presented to an emergency department for youth's assault-related injuries. Analyses revealed an association between parents' and youth's attitudes toward fighting. Youth's and parents' attitudes were positively correlated with aggressive behavior, fighting, and school suspension. Parents' attitudes predicted youth's aggressive behavior, even after controlling for youth's attitudes. The findings suggest that interventions for high-risk youth should target the fighting-related attitudes of both parents and youth.

Stanley RM, Teach SJ, Mann NC, Alpern ER, Gerardi MJ, Mahajan PV, Chamberlain JM and the Pediatric Emergency Care Applied Research Network (PECARN). Variation in Ancillary Testing Among Pediatric Asthmatics Seen in Emergency Departments. *Acad Emerg Med.* 2007 Jun;14(6):532-8. Epub 2007 Apr 19.

BACKGROUND: Variation in the management of acute pediatric asthma within emergency departments is largely unexplored. **OBJECTIVES:** To investigate whether ancillary testing for patients with asthma would be associated with patient, physician, and hospital characteristics. **METHODS:** The authors performed an analysis of a subset of patients from an extensive retrospective chart review of randomly selected charts at all 25 member emergency departments of the Pediatric Emergency Care Applied Research Network. Patients with a diagnosis of asthma were selected for supplemental review and included in this study. Ancillary tests analyzed were chest radiographs and selected blood tests. Hierarchical analyses were performed to describe the associations between ancillary testing and the variables of interest. **RESULTS:** A total of 12,744 chart abstractions were completed, of which 734 (6%) were patients with acute exacerbations of asthma. Overall, 302 patients with asthma (41%) had ancillary testing. Of the 734 patients with asthma, 198 (27%) had chest radiographs and 104 (14%) had blood tests. Chest radiographs were more likely to be ordered in patients with fever. Less blood testing was associated with physician subspecialty training in pediatric emergency medicine, patients treated at children's hospitals, higher patient oxygen saturation, and patient disposition to home. **CONCLUSIONS:** Ancillary testing occurred in more than one third of children with asthma, with chest radiographs ordered most frequently. Efforts to reduce the use of chest radiographs should target the management of febrile patients with asthma, whereas efforts to reduce blood testing should target providers without subspecialty training in pediatric emergency medicine and patients treated in nonchildren's hospitals who are more ill.

Su E, Schmidt TA, Mann NC, Zechnich AD. A randomized controlled trial to assess decay in acquired knowledge among paramedics completing a pediatric resuscitation course. *Acad Emerg Med.* 2000 Jul;7(7):779-86.

BACKGROUND: Critical pediatric illness or injury occurs infrequently in out-of-hospital settings, making it difficult for paramedics to maintain physical assessment, treatment, and procedure skills. **OBJECTIVES:** To document the ability of paramedics to retain clinical knowledge over a one-year interval after completing a pediatric resuscitation course and to determine whether clinical experience or retesting improves retention. **METHODS:** This was a randomized controlled study assessing retention of knowledge in pediatric resuscitation soon after, six months after, and 12 months following completion of a pediatric advanced life support course. Forty-three paramedics participated in pre- and post-pediatric resuscitation course testing and were randomly assigned to one of four groups. Group 1 received a knowledge examination (KE) and mock resuscitation scenarios (MR) at six months. Group 2 received only the KE at six months. Group 3 received the MR only at six months. Group 4 received no intermediate testing. All groups were reassessed at 12 months. **RESULTS:** Pediatric clinical knowledge (as measured by KE) rose sharply immediately after the course but returned to baseline levels within six months. There was no difference between the groups in knowledge scores at 12 months, despite the interventions at six months. **CONCLUSIONS:** Although intensive out-of-hospital pediatric education enhances knowledge, that knowledge rapidly decays. Emergency medical services programs need to find novel ways to increase retention and ensure paramedic readiness.

Suruda A, Burns TJ, Knight S, Dean JM. Health insurance, neighborhood income, and emergency department usage by Utah children 1996–1998. *BMC Health Serv Res.* 2005 Apr 13;5(1):29.

BACKGROUND: It is estimated that approximately half of emergency department (ED) usage in the U.S. and other developed countries is for non-urgent conditions and that this usage is related to availability, social, and economic factors. We examined pediatric ED usage in a U.S. state with respect to income, health insurance status, types of medical conditions, and whether introduction of managed care affected utilization by Medicaid children. **METHODS:** Emergency department usage rates were calculated from 1996 through 1998 using Utah ED data for children with commercial health insurance, Medicaid, for uninsured children, and by income group estimating neighborhood household income from Zip code of residence. We analyzed usage following the July 1996 transition of Utah Medicaid to managed care. **RESULTS:** Children with Medicaid had approximately 50% greater ED utilization rates than children with commercial health insurance or uninsured children. The majority of usage for Medicaid and uninsured children was for non-traumatic conditions. Only 35% of total ED usage was for non-emergent or non-urgent conditions and this was related to both Medicaid and low household income. Children lacking health insurance were more likely to be discharged against medical advice (OR = 2.36, 95% C.I. 1.88-2.96). There was no reduction in Medicaid ED usage following the transition to managed care. **CONCLUSION:** Usage of ED services is related to both health insurance status and income. Children lacking health insurance and

Medicaid children have excessive usage for conditions which could be treated in a primary care setting. That managed care does not reduce Medicaid ED usage is consistent with findings of other studies.

Suruda A, Vernon D, Diller E, Dean JM. Usage of Emergency Medical Services by Children with Special Health Care Needs. *Prehosp Emerg Care*. 2000 Apr-Jun;4(2):131-5.

OBJECTIVE: To describe the usage of emergency medical services (EMS) by children with special health care needs (CSHCN). **METHODS:** All EMS runs and related hospital records for children aged 0-17 years in Utah in 1991-92 were linked. The CSHCN status was determined from ICD-9 diagnoses using three available definitions. The amounts of EMS usage were compared between CSHCN and other children. A pediatric intensive care practitioner determined CSHCN status by chart review for 915 children transported by EMS to a pediatric tertiary care hospital, and his classification was compared with the CSHCN status assigned by the three ICD-9-based definitions. **RESULTS:** The three definitions assigned CSHCN status for 2% to 24% of children using EMS. When compared with other children, CSHCN were more likely to be admitted to the hospital, more likely to use EMS for transfer between health care facilities, and more likely to receive prehospital procedures such as intravenous therapy. In the group of children whose charts were reviewed individually, one ICD-9-based definition most closely agreed to determination of CSHCN status by a pediatric intensive care practitioner. **CONCLUSIONS:** Children with special health care needs who use EMS are more likely to receive advanced life support service, to receive prehospital procedures, and to be transferred from one health care facility to another. There is need for a specific and measurable definition of CSHCN that can be applied to existing health data.

Suruda A, Vernon DD, Reading J, Cook L, Nechodom P, Leonard D, Dean JM. Prehospital emergency medical services: a population based study of pediatric utilization. *Inj Prev*. 1999 Dec;5(4):294-7.

OBJECTIVES: To examine emergency medical services (EMS) usage by children in one state. **METHODS:** Dispatch of an EMS vehicle in response to a call in the US is referred to as a "run". Runs for Utah for 1991-92 were linked to corresponding hospital records. Abbreviated injury severity scores (AISs) were assigned using ICDMAP-90 software. **RESULTS:** For the two year period there were at least 15 EMS runs per 100 children per year, with incomplete reporting from rural areas. EMS response and scene times were similar for all age groups, but interventions were less frequent for children under 5 years of age. When the principal AIS region of injury was the head, neck, or face, cervical immobilization was less frequent for children less than 5 years of age (54%) than for older children (76%) and immobilization was associated with improved outcome, using the crude measure of lower hospital charges. There was a similar association between splinting of upper extremity fractures and reduced hospital charges. Both associations did not appear to be due to differences in injury

severity. CONCLUSIONS: The majority of EMS use by children is for trauma. Children less than 5 years of age are less likely to have an EMS intervention than older children. Whether the lower frequency of interventions is due to the lack of properly sized equipment on the vehicle, or to other factors, is undetermined.

Tilford JM. Cost-effectiveness analysis and emergency medical services for children: issues and applications. *Ambul Pediatr*. 2002 Jul-Aug;2(4 Suppl):330-6.

Studies to assess the cost-effectiveness of alternative treatment or prevention strategies for children are far fewer than those for adults. This article highlights specific issues relevant to the conduct of cost-effectiveness analysis (CEA) in pediatric populations following the recommendations of the US Panel on Cost-effectiveness in Health and Medicine and discusses CEA applications relevant to emergency medical services for children. The article addresses whether patient time should be included in measures of costs, whether caregiver time costs are included and measured properly, and most importantly, whether the study can use quality adjusted life years (QALYs) as an outcome measure. Pediatric researchers may be unable to follow the panel's recommendations for including QALYs as an outcome measure in CEA studies involving young children. Developing preference weights applicable to young children may be a productive field for pediatric researchers. Without such efforts, the field of child health services research in general and the field of emergency medical services for children in particular will continue to lag behind adult fields in assessing the costs and outcomes of the services they provide.

Tilford JM, Parker JG. A gender bias in the allocation of ICU resources? *Crit Care Med*. 2003 Jul;31(7):2073-4.

No abstract available.

Tilford JM, Roberson PK, Lensing S, Fiser DH. Differences in pediatric ICU mortality risk over time. *Crit Care Med*. 1998 Oct;26(10):1737-43.

OBJECTIVES: To compare pediatric intensive care unit (ICU) mortality risk using models from two distinct time periods; and to discuss the implications of changing mortality risk for severity systems and quality-of-care assessment. DATA SOURCES AND SETTING: Consecutive admissions (n = 10,833) from 16 pediatric ICUs across the United States that participate in the Pediatric Critical Care Study Group were recorded prospectively. Data collection occurred during a 12-mo period beginning in January 1993. METHODS: Data collection for the development and validation of the original Pediatric Risk of Mortality (PRISM) score occurred from 1980 to 1985. The original PRISM coefficients were used to calculate mortality probabilities in the current data set. Updated estimates of mortality probabilities were calculated, using coefficients from a logistic regression analysis using the original PRISM variable set. Quality-of-care tests were performed using standardized mortality ratios. RESULTS: Risk of mortality

from pediatric ICU admission improved considerably between the two periods. Overall, the reduction in mortality risk averaged 15% ($p < .001$). Analysis of mortality risk by age indicated a large improvement for younger infants. The mortality risk for infants <1 mo improved by 39% ($p < .001$). Mortality risk improved by 28% ($p < .001$) for infants between 1 and 12 mos. Analysis of mortality risk by principal diagnosis indicated substantial improvement in respiratory diseases, including respiratory diseases developing in the perinatal period. The mortality risk for respiratory diseases improved by 45% ($p < .001$). The improvement in mortality risk substantially deteriorated the calibration of the original PRISM severity system ($p < .001$). As a result of changing mortality risk, the standardized mortality ratios across the 16 pediatric ICUs demonstrated substantial disparities, depending on the choice of models. **CONCLUSIONS:** This study documents differences in pediatric ICU risk of mortality over time that are consistent with a general improvement in the quality of pediatric intensive care. Despite continued widespread use of the original PRISM, recent improvements in pediatric ICU quality of care have negated its usefulness for many intended applications, including quality-of-care assessment.

Tilford JM, Simpson PM, Green JW, Lensing S, Fiser DH. Volume-outcome relationships in pediatric intensive care units. *Pediatrics*. 2000 Aug;106(2 Pt 1):289-94.

CONTEXT: Pediatric intensive care units (PICUs) have expanded nationally, yet few studies have examined the potential impact of regionalization and no study has demonstrated whether a relationship between patient volume and outcome exists in these units. Documentation of an inverse relationship between volume and outcome has important implications for regionalization of care. **OBJECTIVES:** This study examines relationships between the volume of patients and other unit characteristics on patient outcomes in PICUs. Specifically, we investigate whether an increase in patient volume improves mortality risk and reduces length of stay. **DESIGN AND SETTING:** A prospective multicenter cohort design was used with 16 PICUs. All of the units participated in the Pediatric Critical Care Study Group. **Participants.** Data were collected on 11 106 consecutive admissions to the 16 units over a 12-month period beginning in January 1993. **MAIN OUTCOME MEASURES:** Risk-adjusted mortality and length of stay were examined in multivariate analyses. The multivariate models used the Pediatric Risk of Mortality score and other clinical measures as independent variables to risk-adjust for illness severity and case-mix differences. **RESULTS:** The average patient volume across the 16 PICUs was 863 with a standard deviation of 341. We found significant effects of patient volume on both risk-adjusted mortality and patient length of stay. A 100-patient increase in PICU volume decreased risk-adjusted mortality (adjusted odds ratio:.95; 95% confidence interval:.91-.99), and reduced length of stay (incident rate ratio:.98; 95% confidence interval:.975-.985). Other PICU characteristics, such as fellowship training program, university hospital affiliation, number of PICU beds, and children's hospital affiliation, had no effect on risk-adjusted mortality or patient length of stay. **CONCLUSIONS:** The volume of patients in PICUs is

inversely related to risk-adjusted mortality and patient length of stay. A further understanding of this relationship is needed to develop effective regionalization and referral policies for critically ill children.

Tilford JM, Simpson PM, Yeh TS, Lensing S, Aitken ME, Green JW, Harr J, Fiser DH. Variation in therapy and outcomes for pediatric head trauma patients. *Crit Care Med*. 2001 May;29(5):1056-61.

OBJECTIVE: This study was undertaken to examine variation in therapies and outcome for pediatric head trauma patients by patient characteristics and by pediatric intensive care unit. Specifically, the study was designed to examine severity of illness on admission to the pediatric intensive care unit, the therapies used during the pediatric intensive care unit stay, and patient outcomes. **DATA SOURCES AND SETTING:** Consecutive admissions from three pediatric intensive care units were recorded prospectively (n = 5,749). For this study, all patients with an admitting diagnosis of head trauma were included (n = 477). Data collection occurred during an 18-month period beginning in June 1996. All of the pediatric intensive care units were located in children's hospitals, had residency and fellowship training programs, and were headed by a pediatric intensivist. **METHODS:** Admission severity was measured as the worst recorded physiological derangement during the period ≤ 6 hrs before pediatric intensive care unit admission. Therapies and resource use were based on the Therapeutic Intervention Scoring System with adaptations for pediatrics. The use of intracranial pressure monitoring was recorded on admission to the unit (within 1 hr) and at any time during the pediatric intensive care unit stay. Outcomes were measured at the time of pediatric intensive care unit discharge by the Pediatric Overall Performance Category scale. Risk factors for mortality were examined by using bivariate analyses with significant predictors as candidate variables in a logistic regression to predict expected mortality. Intracranial pressure monitoring and other therapies were added to the mortality prediction model to test for protective effects. Finally, race and insurance status were added to the model to test for differences in the quality of care. **RESULTS:** The overall mortality rate for the entire sample was 7.8%. Mortality rates for children ≤ 1 yr old were significantly higher than for children >1 yr old (16.1% vs. 6.1%; p = .002). Comparisons by insurance status indicated that observed mortality rates were highest for self-paying patients. However, patient characteristics were not associated with use of therapies or standardized mortality rates after adjustment for patient severity. There was significant variation in the use of paralytic agents, seizure medications, induced hypothermia, and intracranial pressure monitoring on admission across the three pediatric intensive care units. In multivariate models, only the use of seizure medications was associated significantly with reduced mortality risk (odds ratio = 0.17; 95% confidence interval = 0.04-0.70; p = .014). **CONCLUSIONS:** Therapies and outcomes vary across pediatric intensive care units that care for children with head injuries. Increased use of seizure medications may be warranted based on data from this observational study. Large randomized controlled trials of seizure prophylaxis in children with

head injury have not been conducted and are needed to confirm the findings presented here.

de Vries AP, Kassam-Adams N, Cnaan A, Sherman-Slate E, Gallagher PR, Winston FK. Looking Beyond the Physical Injury: Posttraumatic Stress Disorder in Children and Parents After Pediatric Traffic Injury. *Pediatrics*. 1999 Dec;104(6):1293-9.

BACKGROUND: Traffic crashes are the leading health threat to children in the United States, resulting in nearly 1 million injuries annually. The psychological consequences of these injuries are primarily unknown. The aims of this study were to estimate the prevalence of posttraumatic stress disorder (PTSD) in traffic-injured children and their parents and to identify risk factors for PTSD development. **METHODS:** A prospective cohort study of traffic-injured children between 3 and 18 years of age was conducted at a level 1 Pediatric Trauma Center. The children were enrolled as part of an ongoing surveillance system of traffic-related injuries. Presence and severity of PTSD were determined in the children and their parents through a validated diagnostic questionnaire 7 to 12 months after child injury. **RESULTS:** Twenty-five percent of the children and 15% of the parents suffered diagnostic PTSD, but only 46% of the parents of affected children sought help of any form (including from friends) for their child and only 20% of affected parents sought help for themselves. Child PTSD was associated with older child age and parent PTSD. Parent PTSD was associated with younger child age, child PTSD, and parent witnessing the event. Injury severity was not predictive of PTSD. **CONCLUSIONS:** PTSD in children and their parents is a common, yet overlooked, consequence of pediatric traffic-related injury with prevalence rates similar to those found in children exposed to violence. Physicians managing the pediatric trauma patient, regardless of injury severity or whether the injury was intentional, should screen for PTSD and refer for treatment where appropriate.

Weiss HB, Friedman D, Coben J. Incidence of Dog Bite Injuries Treated in Emergency Departments. *JAMA*. 1998;279:51-53.

Context.— Dog bites that result in injuries occur frequently, but how frequently dog bite injuries necessitate medical attention at a hospital or hospital admission is unknown. **Objective.**— To describe the incidence and characteristics of dog bite injuries treated in US emergency departments (EDs). **Design.**— Emergency department survey from the National Center for Health Statistics National Hospital Ambulatory Medical Care Survey for 1992 to 1994. **Patients.**— National probability sample of patients visiting EDs. **Main Outcome Measure.**— Incidence of dog bites treated in EDs, defined as a cause of injury recorded as the E-code E906.0. **Results.**— The 3-year annualized, adjusted, and weighted estimate of new dog bite-related injury visits to US EDs was 333687, a rate of 12.9 per 10000 persons (95% confidence interval [CI], 10.5-15.4). This represents approximately 914 new dog bite injuries requiring ED visits per day. The median age of patients bitten was 15 years, with children, especially boys aged 5 to 9 years, having the

highest incidence rate (60.7 per 10000 persons for boys aged 5 to 9 years). Children seen in EDs were more likely than older persons to be bitten on the face, neck, and head (73% vs 30%). We estimated that for each US dog bite fatality there are about 670 hospitalizations and 16000 ED visits. Conclusions.— Dog bite injuries are an important source of injury in the US population, especially among children. Improved surveillance and prevention of dog bite–related injuries, particularly among children, are needed.

Wood D, Kalinowski EJ, Miller DR, Newton TJ; National Council of State Emergency Medical Services Training Coordinators. Pediatric continuing education for emergency medical technicians. The National Council of State Emergency Medical Services Training Coordinators. *Pediatr Emerg Care*. 2004 Apr;20(4):261-8.

No abstract available.

Wood D, Kalinowski EJ, Miller DR; National Council of State Emergency Medical Services Training Coordinators. Pediatric continuing education for EMTs: recommendations for content, method, and frequency. The National Council of State Emergency Medical Services Training Coordinators. *Pediatr Emerg Care*. 2004 Apr;20(4):269-72.

No abstract available.

Zuspan, SJ. The Pediatric Emergency Care Applied Research Network. *J Emerg Nurs*. 2006 Aug;32(4):299-303.

No abstract available.

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