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TRAUMATIC STRESS IN INJURED AND ILL CHILDREN

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Many children are treated in medical settings for injuries and severe medical illnesses. Injuries are the single largest cause of morbidity and mortality among children in the United States. The Centers for Disease Control and Prevention reported that close to 10 million children and adolescents under the age of 15 were seen in hospital emergency rooms for injuries in 2000. Technological advances in the medical sciences are saving increasing numbers of children with illness and injuries. These interventions, however, come with traumatic stress consequences. A literature on these consequences in children with injuries and serious medical illnesses is developing. There is a great need to develop research and clinical expertise on the particular manifestations of traumatic stress in medical settings. This emerging area of study, "Medical Traumatic Stress," is the focus of this review. In recognition of the importance of this topic, the Substance Abuse and Mental Health Services Administration (SAMHSA) have funded two Intervention Development and Evaluation Centers devoted to Medical Traumatic Stress as part of the new National Child Traumatic Stress Network. We conclude our review with a description of this important new national initiative.

Severe Medical Illnesses and Procedures. Posttraumatic symptoms have been documented in children from a variety of life-threatening medical illnesses. Stuber et al. (2003) recently reviewed the literature on the relationship between severe medical illness and traumatic stress. Studies with medically ill children have centered on transplants and cancer. Transplant recipients have many sources of traumatic stress, including prior life-threatening illness, transplant procedure, and life-altering recovery. Walker and colleagues (1999) compared 18 children who had undergone liver transplantation and compared these children with other groups of children who had chronic medical illnesses or who had a routine surgical procedure. Posttraumatic symptoms were significantly greater in the liver transplantation group. These authors concluded that the degree of acute life threat in the setting of liver transplantation was important for the development of posttraumatic symptoms. Similarly,

Shemesh and colleagues (2000) found high rates of PTSD symptoms in children who experienced liver transplantation. In particular, these investigators found that the avoidance cluster of symptoms correlated with non-adherence to treatment regimen. This non-adherence with life-preserving medical treatment was related to traumatic stress, as adherence to treatment may serve to remind the child of the trauma. For viability of the liver transplant, immunosuppressive medication adherence is of critical importance. Therefore the life threat associated with liver transplantation may create behavioral symptoms which perpetuate the threat to life in some children.

One of the earliest studies of medically ill children examined those receiving bone marrow transplants (BMT) (Stuber et al., 1991). In this small pilot study, traumatic stress symptoms were identified that persisted up to 12 months after the transplant. Stuber et al. (1997) examined posttraumatic symptoms in a larger group of childhood cancer survivors and reported that these symptoms decreased over one year following diagnosis but persisted in a subset of children. Predictors of symptoms were the appraisal of life threat, level of anxiety, history of stress events, time since termination of treatment, being female, and lack of family support. Pelcovitz et al. (1998) reported that 35% of adolescents with cancer compared with 7% of a comparison group of physically abused adolescents met lifetime criteria for PTSD. Of note, 83% of children with cancer with PTSD had mothers with PTSD. Hobbie et al. (2000) reported that over 20% of adult survivors of childhood cancer met DSM-IV criterion for PTSD. Those with PTSD reported higher perceived life threat and more intense treatment histories.

Other studies of cancer survivors have reported particularly low rates of traumatic stress. Kazak and colleagues (1997) reported no differences in posttraumatic symptoms between leukemia survivors and healthy peers five years after diagnosis. Parents of leukemia survivors had significantly higher levels of posttraumatic symptoms than did the parents of the comparison children. Similarly, Barakat et al. (1997) found no differences in posttraumatic symptoms between cancer survivors and health peers almost 6 years after cancer treatment.

Studies of children with severe medical illnesses have yielded inconsistent findings. As described,

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some studies have reported relatively high rates of posttraumatic symptoms whereas others have reported similar rates to comparison groups of children. The child's perception of life threat and the intensity of medical/surgical treatment appear to be emerging as important risk factors. It is noteworthy that the studies that have reported low rates of posttraumatic symptoms have assessed children many years after the trauma, when the perceived life threat may be significantly diminished. In the area of life-threatening medical illness, the time since the reference trauma is a tangible index of safety, as it may indicate cancer remission or acceptance of transplant. As described, studies of traumatic stress in severe medical illnesses have focused on cancer or transplants. To more fully appraise the impact of severe illness on traumatic stress, future studies should focus on other types of illness.

Injuries. Stoddard and Saxe (2001) recently reviewed the literature on the psychological effects of physical injury. Injuries are the single largest cause of morbidity and mortality among children in the US. De Vries et al. (1999) reported that 25% of children who were injured in traffic accidents and 15% of parents had a diagnosis of PTSD. PTSD was associated with older child age and parent PTSD. Stallard et al. (1998) also studied road traffic accident victims and found that 34.5% had PTSD compared with 3% of children with sports injuries. Female sex, previous experience of trauma, and subjective appraisal to life threat were associated with presence of PTSD. Twelve months after the accident, none of these children were receiving psychological intervention. Winston et al. (2002) found that 88% of children who were admitted to the hospital after a traffic injury and 83% of the parents of those children had at least one symptom of Acute Stress Disorder (ASD). Daviss, Racusin et al. (2000) found that almost 30% of hospitalized injured children had clinically significant symptoms of ASD. These investigators also reported that 12.5% of these children had PTSD at follow-up one month after injury. Risk factors for PTSD were the child's prior level of psychopathology, higher parental acute distress, and higher rates of sexual abuse (Daviss, Mooney et al., 2000).

Burn injury and its treatment may be particularly potent traumatic stressors. Recovery in the hospital usually involves painful dressing changes, and often the child must adjust to permanent changes in his or her body's appearance and function. Over 50% of burn-injured children display posttraumatic symptoms (Stoddard et al., 1989).

There is an emerging literature on the treatment of acutely injured children. One important focus of this literature is to determine if acute interventions can diminish the risk of PTSD. In a naturalistic study, Saxe et al. (2001) found that the dose of morphine burned children received while in the hospital diminished posttraumatic symptoms over six months following discharge. Morphine may have diminished symptoms through blocking fear conditioning and noxious signals in the locus coeruleus and amygdala. There are great opportunities to study acute preventative interventions in injured children. The literature on

intervention for injured and ill children with traumatic stress is not developed. Effective treatments developed for child traumatic stress for other groups of traumatized children should be assessed with cohorts of injured and ill children. It is important to adapt known, empirically validated treatment models to the special needs of injured and ill children. An area of particular importance is the development of interventions to diminish distress during medical and surgical procedures.

Conceptual and Methodological Concerns. The investigation of traumatic stress in children with severe illnesses and injuries is a relatively new area of study. Accordingly, advancement of this area will require clarity on a number of conceptual and methodological problems:

(1) *When is an injury or an illness a traumatic stressor?* Although this methodological problem affects many areas of traumatic stress study, it is a particularly important one for the area of illness and injuries. According to the DSM-IV, a traumatic event occurs when a person is exposed to an event or events that "...involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others." Notions of "threatened death," "serious injury," and "threat to physical integrity" are obviously highly relevant to the experience of children with injuries and severe illnesses. There is nevertheless a question of how such constructs are defined. Are these constructs to be subjectively or objectively defined? The literature is suggesting that the subjective perception of life threat is particularly important, but illnesses and injuries that may be perceived as life-threatening for one child may be perceived as relatively benign for another. How should chronic illnesses such as asthma, diabetes, or inflammatory bowel diseases be considered? Each of these illnesses can have acute, life-threatening manifestations. Advances in medical sciences are now blurring the distinction between an acute life-threatening illness and a chronic disease. Many cancers and AIDS can now be considered chronic diseases. Which medical or surgical procedures constitute "...a threat to the physical integrity of self"? Many medical procedures involve an invasion of the body. When can these reasonably be considered such a "threat"? As described, there is a growing literature about highly painful procedures, such as bone marrow aspiration. Can relatively common procedures such as lumbar puncture or even venipuncture ever reasonably be considered a traumatic stressor? There are a wide variety of severities of injury in both hospitalized and non-hospitalized children. When does the injury become severe or "serious" enough? Illness and injury and its treatment are mixed with variables such as life threat, pain, disability, and invasion of the body. Which takes precedence in defining the traumatic stressor?

The literature offers little guidance towards these problems. The perception of life threat has emerged as an important guiding variable although, as described, there are problems associated with this. As more becomes known about different illnesses and the relationship between their medical and psychological course, answers to these fundamental questions will emerge.

(2) *The meaning of illness and injury.* The meaning and experience of injury, illness, and medical care is complex. Cultural, religious, and developmental considerations are extremely important. Individuals have sought to make sense of sudden life-threatening injuries and illnesses across the centuries. When severe illness and injury strikes a child, additional layers of complexity are involved for families and communities. The subjective perception of such constructs as disease, pain, disability, and death are strongly informed by children's developmental level, by their religious and cultural backgrounds, and by their families' and caregivers' response. Researchers must be mindful of the need to capture subjective meanings and the need to account for developmental, cultural, and religious variation. Of note, the meaning and experience of medical and surgical care is particularly complex for children who have experienced other traumatic events, particularly sexual abuse. Medical and surgical care involves the therapeutic invasion of the body. This can be highly provocative for the sexually abused child.

(3) *Developmental considerations.* Developmental issues must be considered. The meaning of an illness or injury, and its treatment, is very different for an infant and toddler, a pre-schooler, a school-aged child, and an adolescent. The appraisal and experience of such critical constructs as pain, disability, life threat, and death is highly developmentally determined and likely affects symptoms and recovery. Many infants, toddlers, and preschoolers are hospitalized with injuries and illness, but few have been assessed in research studies. Little is known about traumatic stress in injured and ill children who are very young. Although this research is challenging, it is also critically important.

The National Child Traumatic Stress Network (NCTSN; www.nctsn.org) was funded by SAMHSA in October 2001 in order to address the national public health concern of traumatic stress in children. The mission of the NCTSN is "To raise the standard of care and improve access to services for traumatized children, their families and communities throughout the United States." The NCTSN is composed of three components: (1) the National Center for Child Traumatic Stress, a coordinating center based at Duke University and the University of California in Los Angeles, (2) 10 Intervention Development and Evaluation Centers (IDECs) which are charged with "identifying, supporting, improving, and developing treatment and service approaches for different types of child and adolescent traumatic events," and (3) 25 Community Treatment and Service Centers (CTSCs) which are charged with implementing and evaluating effective treatment and services in community settings. The NCTSN is designed to be a highly coordinated network of programs for developing and implementing best practices for traumatic stress care in children and to advance their standard of care, nationally.

Medical Traumatic Stress has been an important component of the NCTSN from its origins. Two IDECs, based at Boston Medical Center and Children's Hospital of Philadelphia, are fully devoted to this area of care and study. We expect that with the considerable resources of

the NCTSN and its devotion to the special needs of injured and ill children that this important area of pursuit will advance considerably.

SELECTED ABSTRACTS

DAVISS, W.B., MOONEY, D., RACUSIN, R., FORD, J.D., FLEISCHER, A., & MCHUGO, G.J. (2000). **Predicting posttraumatic stress after hospitalization for pediatric injury.** *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 576-583. *Objective:* To determine the prevalence and predictors of PTSD in children after hospitalizations for accidental injuries. *Method:* 48 children (aged 7-17 years) and their parents were assessed during hospitalization with measures of children's prior traumatization, prior psychopathology, injury severity, parental acute distress, and child acute distress. At outpatient follow-up at least 1 month later, children were evaluated for current PTSD diagnosis and PTSD symptomatology (PTSDS) by a child structured interview and for PTSDS by a parent questionnaire. *Results:* A total of 12.5 percent had the full syndrome of PTSD at follow-up, and an additional 16.7 percent had partial (subsyndromal) PTSD. Full PTSD was associated with a higher level of prior psychopathology, higher parental acute distress, and higher rates of prior sexual abuse, compared with partial or no PTSD. Prior psychopathology, parental distress, and, to a lesser extent, children's acute distress as reported by parents and breadth of prior traumatization, predicted subsequent PTSDS. *Conclusions:* Full or partial PTSD is relatively common in youths 1 month or more after hospitalization for injuries. Parents' acute distress as well as children's prior psychopathology, prior traumatization, and acute distress may be useful predictors of such injured children's subsequent PTSD or PTSDS.

DAVISS, W.B., RACUSIN, R., FLEISCHER, A., MOONEY, D., FORD, J.D., & MCHUGO, G.J. (2000). **Acute stress disorder symptomatology during hospitalization for pediatric injury.** *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 569-575. *Objective:* To examine and identify predictors of acute stress disorder (ASD) and ASD symptomatology (ASDS) in children hospitalized for injuries. *Method:* 54 youths were assessed while hospitalized for injuries. Dependent variables were parent and nurse ratings of children's ASDS. Independent variables included children's prior trauma exposure and behavior problems, injury severity and permanence, brain injury, injury or death to family/friend(s), parental distress, and child reports of the injury/hospitalization experience as meeting criterion A for ASD. *Results:* A total of 92.6% of children felt the current experience met criterion A, compared with 64.8% of parents. According to parent questionnaires, 4 subjects (7.4 percent) met DSM-IV criteria for ASD while another 12 (22.2 percent) had clinically significant but subsyndromal ASDS. Children's ASDS, as reported by parents, correlated highly with parental distress and ratings of children's prior psychopathology, and modestly with injury severity and family/friend(s) injured or killed. Nurses' ratings of children's ASDS correlated strictly with injury- and accident-related variables, and not with parent ratings of children's ASDS. *Conclusions:* Children perceive injuries and hospitalizations as stressful. ASDS is widely though divergently reported by parents and nurses in children hospitalized for injury. Parental distress, children's prior psychopathology, and injury-related factors may be useful predictors of children's postinjury ASDS.

DE VRIES, A.P.J., KASSAM-ADAMS, N., CNAAN, A., SHERMAN-SLATE, E., GALLAGHER, P.R., & WINSTON, F.K. (1999). **Looking beyond the physical injury: Posttraumatic stress disorder in children and parents after pediatric traffic injury.**

Pediatrics, 104, 1293-1299. **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 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.

KAZAK, A.E., BARAKAT, L.P., MEESKE, K.A., CHRISTAKIS, D.A., MEADOWS, A.T., CASEY, R., PENATI, B., & STUBER, M.L. (1997). **Posttraumatic stress, family functioning, and social support in survivors of childhood leukemia and their mothers and fathers.** *Journal of Consulting and Clinical Psychology*, 65, 120-129. Psychological sequelae are examined in 130 former childhood leukemia patients and 155 comparison participants and their parents. The major dependent variables are symptoms of anxiety and posttraumatic stress, family functioning, and social support. Multivariate analyses of covariance indicated significantly more posttraumatic stress symptoms in mothers and fathers of childhood leukemia survivors ($p < .001$) and no differences between survivors and peers. There were no significant group differences for family functioning or social support, although they were associated with anxiety and posttraumatic stress outcomes. Current child age, age at diagnosis, and months off treatment were not significantly correlated with outcome. These findings document the long-term impact of childhood cancer treatment on parents. The lack of significant differences for survivors argues for further attention to the relevance of PTSD for childhood cancer survivors. The clinical implications are that psychological interventions are needed during and after cancer treatment.

PELCOVITZ, D., LIBOV, B.G., MANDEL, F.S., KAPLAN, S.J., WEINBLATT, M., & SEPTIMUS, A. (1998). **Posttraumatic stress disorder and family functioning in adolescent cancer.** *Journal of Traumatic Stress*, 11, 205-221. Twenty-three adolescents with a history of cancer, 27 physically abused adolescents, and 23 healthy, non-abused adolescents were administered structured PTSD interviews and self-report questionnaires regarding family functioning. Thirty-five percent of adolescent cancer subjects met criteria for lifetime PTSD as compared to only 7% of the abused adolescents: 17% of the cancer subjects and 11% of the abuse subjects met criteria for current PTSD. Adolescents with cancer viewed their mothers and fathers as significantly more caring and more protective than the comparison and abused adolescents. Cancer subjects who met criteria for lifetime PTSD saw their

families as significantly more chaotic than those who did not have PTSD. Eighty-three percent of cancer subjects who had lifetime PTSD also had mothers who had PTSD.

SAXE, G.N., STODDARD, F.J., COURTNEY, D., CUNNINGHAM, K., CHAWLA, N., SHERIDAN, R.L., KING, D.W., & KING, L.A. (2001). **Relationship between acute morphine and the course of PTSD in children with burns.** *Journal of the American Academy of Child & Adolescent Psychiatry*, 40, 915-921. **Objective:** To investigate the relationship between the dose of morphine administered during a child's hospitalization for an acute burn and the course of PTSD symptoms over the 6-month period following discharge from the hospital. **Method:** Twenty-four children admitted to the hospital for an acute burn were assessed twice with the Child PTSD Reaction Index: while in the hospital and 6 months after discharge. The Colored Analogue Pain Scale was also administered during the hospitalization. All patients received morphine while in the hospital. The mean dose of morphine (mg/kg/day) was calculated for each subject through chart review. **Results:** The Pearson product moment correlation revealed a significant association between the dose of morphine received while in the hospital and a 6-month reduction in PTSD symptoms. Children receiving higher doses of morphine had a greater reduction in PTSD symptoms over 6 months. **Conclusions:** This study suggests the possibility that acute treatment with morphine can secondarily prevent PTSD. This result is discussed in terms of the possible effect of morphine on fear conditioning and the consolidation of traumatic memory.

SHEMESH, E., LURIE, S., STUBER, M.L., EMRE, S., PATEL, Y., VOHRA, P., AROMANDO, M., & SHNEIDER, B.L. (2000). **A pilot study of posttraumatic stress and nonadherence in pediatric liver transplant recipients.** *Pediatrics*, 105, E29. **Background:** Symptoms of PTSD were described in survivors of life-threatening diseases, the trauma being the experiences associated with the disease or its treatment. Their prevalence in liver transplant recipients is unknown. Based on clinical observations, we hypothesize that a significant proportion of pediatric liver transplant recipients suffers from PTSD symptoms. We further hypothesize that nonadherence (noncompliance) to medical management may, in some cases, be associated with these symptoms. Traumatized patients, according to this hypothesis, will avoid taking their medications, because these serve as painful reminders of the disease. **Objectives:** To determine the prevalence of PTSD symptoms in a sample of pediatric liver transplant recipients. To determine whether symptoms of PTSD are associated with nonadherence in these patients. To describe the clinical presentation of PTSD and the management of severe nonadherence in patients who suffer from this disorder. **Methods:** Nineteen pediatric liver transplant recipients and their caretakers were interviewed, using the UCLA PTSD Reaction Index (PTSRI). Data were obtained on a few demographic parameters and perception of disease threat. Adherence was evaluated by 2 methods: 1) a clinician panel (taking into account the clinical sequelae of severe nonadherence); and 2) computation of the standard deviations (SDs) of consecutive determinations of blood levels of Tacrolimus (a higher SD means higher variability between individual measures and is therefore an indicator of nonadherence). As an illustration of the general phenomenon, we describe 3 cases of liver transplant recipients who were nonadherent and who suffered from PTSD. **Results:** Six of 19 patients had positive scores on all 3 components of the PTSRI (PTSD patients). Three of these, and none of the others, were considered significantly nonadherent by the panel. Therefore, nonadherence was significantly associated with the existence of symptoms from all 3 domains of PTSD

(Fisher's exact test) in our sample. In particular, a high avoidance score on the PTSRI was highly correlated with panel-determined nonadherence. Further, SD of medication levels were significantly higher in PTSD patients, compared with the rest of our sample. No significant differences were found in perception of disease threat or demographic variables between PTSD patients and the rest of our sample. The 3 cases that we describe became adherent to their medications when symptoms of PTSD subsided during the course of therapy. *Conclusions:* Clinically significant nonadherence, determined by 2 different methods, was associated with the full spectrum of PTSD symptoms in this sample. It was especially associated with a high avoidance score, which suggests that avoidance of reminders of the disease (eg, medications) may be a mechanism of nonadherence. Screening for and management of these symptoms, therefore, may improve adherence. This novel concept may be applicable to other patient populations. However, more data are needed before any definite conclusions can be drawn.

STALLARD, P., VELLEMAN, R., & BALDWIN, S. (1998). **Prospective study of post-traumatic stress disorder in children involved in road traffic accidents.** *British Medical Journal*, *317*, 1619-1623. *Objective:* To determine the prevalence of severe psychological trauma—that is, PTSD—in children involved in everyday road traffic accidents. *Design:* 12-month prospective study. *Setting:* Accident and emergency department, Royal United Hospital, Bath. *Subjects:* 119 children aged 5-18 years involved in road traffic accidents and 66 children who sustained sports injuries. *Main Outcome Measure:* Presence of appreciable psychological distress; fulfillment of diagnostic criteria for post-traumatic stress disorder. *Results:* PTSD was found in 41 (34.5%) children involved in road traffic accidents but only two (3.0%) who sustained sports injuries. The presence of PTSD was not related to the type of accident, age of the child, or the nature of injuries but was significantly associated with sex, previous experience of trauma, and subjective appraisal of threat to life. None of the children had received any psychological help at the time of assessment. *Conclusions:* One in three children involved in road traffic accidents was found to suffer from PTSD when they were assessed 6 weeks after their accident. The psychological needs of such children after such accidents remain largely unrecognized.

STODDARD, F.J., NORMAN, D.K., & MURPHY, J.M. (1989). **A diagnostic outcome study of children and adolescents with severe burns.** *Journal of Trauma*, *29*, 471-477. The results of a diagnostic outcome study of children and adolescents with severe burns are presented. The positive research findings include evidence of present and lifetime full and partial anxiety and depressive disorders and statistically significant within-sample, burn-related, and demographic differences. The negative findings are less depression and PTSD by DSM-III criteria than expected, the presence of a subgroup of severely burned children who appeared to be functioning well with only a few or no diagnoses, and absence of significant differences on many variables on within-group comparisons. Based on these data, periodic psychiatric evaluation or reevaluation and specifically targeted followup treatment are indicated for many burned children, adolescents, and their families.

STODDARD, F.J., & SAXE, G.N. (2001). **Ten-year research review of physical injuries.** *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*, 1128-1145. *Objective:* To review the past 10 years of research relevant to psychiatry on injuries in children and adolescents. *Method:* A literature search of databases for "wounds and injuries, excluding head injuries" was done with Medline and PsycINFO, yielding 589 and 299 citations, respectively. Further

searching identified additional studies. *Results:* Progress is occurring in prevention, pain management, acute care, psychiatric treatment, and outcomes. The emotional and behavioral effects of injuries contribute to morbidity and mortality. Psychiatric assessment, crisis intervention, psychotherapy, psychopharmacological treatment, and interventions for families are now priorities. Research offers new interventions for pain, delirium, PTSD, depression, prior maltreatment, substance abuse, disruptive behavior, and end-of-life care. High-risk subgroups are infants, adolescents, maltreated children, suicide attempters, and substance abusers. Staff training improves quality of care and reduces staff stress. *Conclusions:* Despite the high priority that injuries receive in pediatric research and treatment, psychiatric aspects are neglected. There is a need for assessment and for planning of psychotherapeutic, psychopharmacological, and multimodal treatments, based on severity of injury, comorbid psychopathology, bodily location(s), and prognosis. Psychiatric collaboration with emergency, trauma, and rehabilitation teams enhances medical care. Research should focus on alleviating pain, early psychiatric case identification, and treatment of children, adolescents, and their families, to prevent further injuries and reduce disability.

STUBER, M.L., KAZAK, A.E., MEESKE, K.A., BARAKAT, L.P., GUTHRIE, D., GARNIER, H., PYNOOS, R.S., & MEADOWS, A.T. (1997). **Predictors of posttraumatic stress symptoms in childhood cancer survivors.** *Pediatrics*, *100*, 958-964. *Objective:* The diagnosis and treatment of childhood cancer are extremely stressful experiences, with psychological sequelae which can persist many years after the end of treatment. This study investigated the relative contributions of general anxiety, treatment intensity, medical sequelae of treatment, and the subjective appraisal of life threat and treatment intensity to later posttraumatic stress symptoms, such as intrusive memories, avoidance, and hypervigilance. *Method:* One hundred eighty-six childhood cancer survivors ages 8 through 20 years, off of treatment for more than 1 year, and their parents completed questionnaires. Medical sequelae of treatment and intensity of treatment were rated by a pediatric oncologist. *Results:* Significant, independent predictors of persistent posttraumatic stress symptoms included: 1) the survivor's retrospective subjective appraisal of life threat at the time of treatment, and the degree to which the survivor experienced the treatment as "hard" or "scary"; 2) the child's general level of anxiety; 3) history of other stressful experiences; 4) time since the termination of treatment (negative association); 5) female gender; and 6) family and social support. Mother's perception of treatment and life threat contributed to anxiety and subjective appraisal for the survivor, but did not independently contribute to posttraumatic stress symptoms. *Conclusions:* Symptoms of posttraumatic stress seem to decrease with time, but are persistent in a subset of childhood cancer survivors. Other than time and gender, the predictors of posttraumatic stress symptoms are primarily subjective factors (ie, anxiety and subjective appraisal) rather than objective stressors of treatment and medical sequelae.

STUBER, M.L., NADER, K.O., YASUDA, P., PYNOOS, R.S., & COHEN, S.E. (1991). **Stress responses after pediatric bone marrow transplantation: Preliminary results of a prospective longitudinal study.** *Journal of the American Academy of Child and Adolescent Psychiatry*, *30*, 952-957. This paper reports the preliminary findings of a longitudinal prospective study of young children undergoing bone marrow transplantation. Symptoms of post-traumatic stress were seen in these children up to 12 months after transplant. The bone marrow transplantation survivors demonstrated more denial and avoidance and fewer arousal symptoms than has been noted in

children traumatized by a violent life threat, such as a sniper attack. These data suggest the use of post-traumatic stress as a model in understanding some of the symptoms of pediatric bone marrow transplantation survivors and may be applicable to other children exposed to the double life threat of serious illness and intensive medical intervention.

WALKER, A.M., HARRIS, G., BAKER, A., KELLY, D., & HOUGHTON, J. (1999). **Post-traumatic stress responses following liver transplantation in older children.** *Journal of Child Psychology and Psychiatry*, 40, 363-374. Eighteen children aged between 7 and 16 years who had undergone a liver transplantation were interviewed using the Child Post-Traumatic Stress Reaction Index (CPTS-RI) to discover if they had post-traumatic stress symptoms. A case control design was used to define which factors were important for the development of post-traumatic stress. Results of a one-way analysis of variance, with post-traumatic stress symptom intensity as measured on the CPTS-RI as the dependent variable, revealed a significant difference between the liver transplantation group compared with children who had a chronic life-threatening illness or had undergone a routine surgical operation. A post hoc statistical analysis was performed and significance at the .05 level was found between the liver transplantation group and both the chronic illness group and the routine surgical operation group. Our results indicate that the acute life-threat involved in the liver transplantation contributed to the development of post-traumatic stress. It was thought that dissociation may be important in preventing the resolution of the trauma.

WINSTON, F.K., KASSAM-ADAMS, N., VIVARELLI-O'NEILL, C., FORD, J.D., NEWMAN, E., BAXT, C., STAFFORD, P., & CNAAN, A. (2002). **Acute stress disorder symptoms in children and their parents after pediatric traffic injury.** *Pediatrics*, 109, e90. *Objective:* The American Academy of Pediatrics highlights the important role of pediatricians in recognizing adverse child responses to tragic events, such as traffic crashes. One challenge in effectively identifying children and their parents with troubling psychological responses to trauma is that little is known about the normal range of acute psychological responses in children and their parents in the immediate aftermath of traumatic events, making identification of adverse child responses difficult. Within the first month after a traumatic event, individuals may display reexperiencing, avoidance, and hyperarousal symptoms as well as dissociation (e.g., feelings of unreality or emotional numbing). The presence of these responses, collectively known as acute stress disorder (ASD), alerts providers to those who may be at risk for ongoing difficulties. For beginning to develop an evidence base to guide pediatric care providers in addressing acute traumatic responses, the aim of the current investigation was to describe systematically the range and type of symptoms of ASD in children and their parents after pediatric traffic injury. *Methods:* A prospective cohort study was conducted of traffic-injured children, who were 5 to 17 years of age and admitted to the hospital for treatment of injuries from traffic crashes, and their parents. All children who met eligibility criteria between July 1999 and May 2000 were invited to participate in the study. After consent/assent was obtained, children and their custodial parents (or guardians) were interviewed within 1 month after injury via a structured assessment to determine the circumstances of the crash and the presence of ASD symptoms. Relevant demographic and clinical information (e.g., age, race, gender, date of injury) was abstracted from the medical records of subjects. A survey instrument to assess the presence of ASD symptoms was completed by both the child and his or her guardian. All children completed the Child Acute Stress Questionnaire, and all parents completed the Stanford Acute

Stress Reaction Questionnaire. Responses were scored for the presence of dissociation, reexperiencing, avoidance, and/or hyperarousal symptoms as well as broad distress (symptoms present in every category). *Results:* Symptoms of ASD were commonly observed in the children and parents. 88% of children and 83% of parents reported having at least 1 clinically significant symptom; this affected 90% of the families. Broad distress was observed for a large minority: 28% of children and 23% of parents. No statistically significant association was found between child broad distress and either child age ($r = -0.12$) or child injury severity score ($r = -0.05$). Chi-squared analyses revealed no significant association between broad distress and child gender, child race, or mechanism of injury. No statistically significant association was found between parent broad distress and child age ($r = -0.06$) or child injury severity score ($r = 0.09$). Chi-squared analyses revealed no significant association between parent broad distress and child gender or parent presence at the crash scene. Associations were found between parent broad distress and race in that fewer white parents reported broad distress. In addition, mechanism of injury was associated with parent broad distress: more parents reported broad distress when their children were involved in pedestrian-motor vehicle crashes, and fewer parents reported broad distress when their children were injured in a bicycle fall. *Conclusions:* Pediatric care providers can expect to see some ASD symptoms in most children and parents in the immediate aftermath of traffic-related injury. Brief education is appropriate to explain that these symptoms are normal reactions that are likely to resolve. If symptoms persist for > 1 month or are particularly distressing in their intensity, then referral for psychological care may be necessary for treatment of PTSD. Given the high prevalence of pediatric traffic crashes and the underdiagnosis of PTSD, probing for recent crash exposure might be appropriate during routine child health maintenance. The following are recommendations for pediatricians: (1) routinely call the family several days and 1 to 2 weeks after a traffic injury and ask about behavioral symptoms and family function; (2) make use of the ongoing physician-patient relationship to explore symptom presence and intensity and any functional impairment in the injured child (a brief office visit with the child and parents could serve this purpose); (3) be sure to explore the effect that the child's injury has had on the family; remember that the parents experience posttraumatic stress symptoms after pediatric traffic-related injuries and these symptoms may limit the parent's ability to support the child; (4) provide supportive care and give families the opportunity to discuss the crash and their current feelings—do not force families to talk about the crash; (5) although any child in a traffic crash or his or her parent is at risk for posttraumatic symptomatology, regardless of injury severity, particular attention should be paid to the parents of child pedestrians who are struck by motor vehicles. These parents experience posttraumatic symptoms more commonly than parents of children in other traffic crashes.

ADDITIONAL CITATIONS Annotated by the Editor

BARAKAT, L.P., KAZAK, A.E., MEADOWS, A.T., CASEY, R., MEESKE, K.A., & STUBER, M.L. (1997). **Families surviving childhood cancer: A comparison of posttraumatic stress symptoms with families of healthy children.** *Journal of Pediatric Psychology*, 22, 843-859.

Examined differences in PTSD symptoms between 309 8-20 year-old cancer survivors and their parents and 219 healthy children and their parents. Parents of cancer survivors had more symptoms than parents of healthy children, but survivors did not differ from comparison children.

BUTLER, R.W., RIZZI, L.P., & HANDWERGER, B.A. (1996). **Brief report: The assessment of posttraumatic stress disorder in pediatric cancer patients and survivors.** *Journal of Pediatric Psychology, 21*, 499-504.

Used parent reports to assess PTSD in 30 children who were receiving cancer treatment and 42 children who had completed cancer treatment. Relative to children without PTSD, those with PTSD were more likely to be receiving treatment or to be awaiting a bone-marrow transplant.

ERICKSON, S. J. & STEINER, H. (2000). **Trauma spectrum adaptation: Somatic symptoms in long-term pediatric cancer survivors.** *Psychosomatics, 41*, 339-346.

Assessed PTSD and somatic symptoms in 40 pediatric cancer survivors. Only 10% of the children met criteria for PTSD, but 78% met criteria for partial PTSD. PTSD severity was positively correlated with a higher number of somatic symptoms. Underreporting of distress was positively associated with somatic symptoms and a tendency to use denial as a defensive style.

FEIN, J.A., KASSAM-ADAMS, N., GAVIN, M., HUANG, R., BLANCHARD, D., & DATNER, E.M. (2002). **Persistence of posttraumatic stress in violently injured youth seen in the emergency department.** *Archives of Pediatrics & Adolescent Medicine, 156*, 836-840.

Assessed PTSD in 69 injured children when they were first brought to an emergency room and then 5 months later. Twenty-five percent of children reported significant acute stress symptoms at the initial assessment, and 15% reported significant PTSD symptoms at follow-up.

GLOVER, D.A. & POLAND, R.E. (2002). **Urinary cortisol and catecholamines in mothers of child cancer survivors with and without PTSD.** *Psychoneuroendocrinology, 27*, 805-819.

Measured 12-hour urinary cortisol and catecholamines in 21 mothers of childhood cancer survivors (14 who had PTSD or partial PTSD and 7 who did not have PTSD) and 8 mothers of healthy children. Mothers with PTSD had lower cortisol, and possibly higher norepinephrine relative to survivors without PTSD, who did not differ from mothers of healthy children.

HOBBIE, W.L., STUBER, M.L., MEESKE, K., WISSLER, K., ROURKE, M.T., RUCCIONE, K., HINKLE, A., & KAZAK, A.E. (2000). **Symptoms of posttraumatic stress in young adult survivors of childhood cancer.** *Journal of Clinical Oncology, 18*, 4060-4066.

Assessed PTSD and other symptoms in 78 adult survivors of childhood cancer an average of 11 years after they had completed cancer treatment. Just over 20% met criteria for lifetime PTSD. Neither PTSD symptoms nor a PTSD diagnosis was associated with reports of treatment intensity or information about treatment derived from medical chart review.

KAZAK, A.E., PENATI, B., BOYER, B.A., HIMELSTEIN, B., BROPHY, P., WAIBEL, M.K., BLACKALL, G.F., DALLER, R., JOHNSON, K. (1996). **A randomized controlled prospective outcome study of a psychological and pharmacological intervention protocol for procedural distress in pediatric leukemia.** *Journal of Pediatric Psychology, 21*, 615-631.

Conducted a randomized clinical trial to compare the effects of pharmacotherapy versus combined pharmacotherapy and psychotherapy for treating distress in 45 children undergoing treatment for leukemia. The combined treatment was more effective than pharmacotherapy only.

KAZAK, A.E., STUBER, M.L., BARAKAT, L.P., MEESKE, K.A., GUTHRIE, D., & MEADOWS, A.T. (1998). **Predicting posttraumatic stress symptoms in mothers and fathers of survivors of childhood cancers.** *Journal of the American Academy of Child & Adolescent Psychiatry, 37*, 823-831.

Used multiple regression and path analysis to examine predictors of PTSD symptoms in parents of 320 pediatric cancer survivors. Trait anxiety was the strongest predictor for both mothers ($n = 320$) and fathers ($n = 224$). Perceived life threat, perceived treatment intensity, and social support also predicted symptoms.

KEPPEL-BENSON, J.M., OLLENDICK, T.H., & BENSON, M.J. (2002). **Post-traumatic stress in children following motor vehicle accidents.** *Journal of Child Psychology & Psychiatry & Allied Disciplines, 43*, 203-212.

Studied 50 children and their parents approximately 9 months after they were involved in a motor vehicle accident. Fourteen percent of the children had PTSD, and an additional 10% had an accident-related phobia. A greater amount of physical injury was related to higher symptom severity, and prior accident experience was related to lesser severity.

LURIE, S., SHEMESH, E., SHREINER, P.A., EMRE, S., TINDLE, H.L., MELCHIONNA, L., & SCHNEIDER, B.L. (2000). **Non-adherence in pediatric liver transplant recipients—an assessment of risk factors and natural history.** *Pediatric Transplantation, 4*, 200-206.

Used retrospective chart review to examine risk factors for nonadherence in pediatric liver transplant patients. The investigators compared 3 extremely nonadherent patients with 15 age-matched patients who were randomly selected from clinic records. Variables for which the nonadherent group was at least 50% higher than the comparison group included history of child abuse.

ROBERT, R., BLAKENEY, P.E., VILLARREAL, C., ROSENBERG, L., & MEYER, W.J. (1999). **Imipramine treatment in pediatric burn patients with symptoms of acute stress disorder: A pilot study.** *Journal of the American Academy of Child & Adolescent Psychiatry, 38*, 873-882.

Conducted a randomized clinical trial to compare the effects of a 7-day course of low-dose imipramine or chloral hydrate on symptoms of acute stress disorder in pediatric burn patients. Children who received imipramine were more likely than children who received chloral hydrate to be treatment responders.

STUBER, M.L., NADER, K.O., HOUSKAMP, B.M., & PYNOOS, ROBERT S. (1996). **Appraisal of life threat and acute trauma responses in pediatric bone marrow transplant patients.** *Journal of Traumatic Stress, 9*, 673-686.

Used path analysis to examine predictors of PTSD symptoms in 186 children and young adults who had survived cancer. Independent predictors were perceived life threat and experiencing the treatment as frightening, greater anxiety, history of other stressful events, more recent treatment, female gender, and social support.

STUBER, M.L., SHEMESH, E., & SAXE, G.N. (2003). **Posttraumatic stress responses in children with life-threatening illnesses.** *Child and Adolescent Psychiatric Clinics of North America, 12*, 195-209.

Reviews evidence on PTSD resulting from life-threatening illness. Topics covered include epidemiology, predictors of PTSD in medical patients, treatment implications, and diagnostic issues such as uncertainty about the stressor (e.g., the illness vs. the treatment for the illness) and the need to distinguish between the effects of trauma and the effects of disease.

PILOTS UPDATE

In calendar year 2002 over 100,000 connections were made to the PILOTS database. Ours is not the only database whose use is growing. A study conducted at a midwestern health sciences library found that bibliographical databases are heavily used by students, faculty, and residents. 93% of respondents personally searched online databases, with 53% searching MEDLINE at least once a week (De Groote and Dorsch, 2003). But just because bibliographic databases are being searched often does not mean that they are being searched well.

American universities are increasingly requiring their students to become familiar with online databases specific to their studies, and to be able to select terms from discipline-specific controlled vocabularies and construct search strategies using commands for specific information retrieval systems. Today's undergraduates may be acquiring critical information competencies, but their elders may not have had that opportunity. It is often difficult to ascertain from their publications how well they understand and use databases in their research.

The purpose of scientific publication is not only to announce research results, but also to present the methodology employed in sufficient detail that readers can evaluate the work performed and the conclusions drawn from it. Thus it is customary to specify the animal models, assessment instruments, and drug dosages used in medical or psychological studies. Anyone undertaking bibliographical research should be equally scrupulous, both in planning the study and in reporting its results.

Whether it be a bibliometric study or a literature review, any publication based upon searching a bibliographical database should describe that search in sufficient detail to allow a knowledgeable reader to evaluate and replicate it. It is not sufficient to name the databases searched, the years covered, and the search terms employed. In order to determine how much credence to place in the results reported and conclusions reached, the reader must know how well

the search was conceived and how competently it was performed.

To begin with, some justification should be provided for the selection of the databases used. Did this depend upon their scope and coverage, or upon some special search technique they offered, or because they were readily and cheaply available? If relevant databases were not searched, was there some reason for the omission?

It is critical to explain in some detail the search strategies employed, and the resources used in constructing them. Readers must be told whether the terms searched were taken from the database's controlled vocabulary. (A search of MEDLINE that does not employ MeSH terms from *Medical Subject Headings*, or a search of PsycINFO that does not employ terms chosen from the *Thesaurus of Psychological Index Terms*, is unlikely to yield reliable results — nor would a PILOTS database search undertaken without recourse to the PILOTS Thesaurus.) It is not sufficient to identify "key words" or "search terms" used, unless those expressions have a specific meaning with regard to the database. Not specifying if a "key word" means a descriptor from a controlled vocabulary or a free-text term is like describing an animal experiment without specifying whether the subjects were mice or monkeys.

It is encouraging to learn that information competencies are increasingly being demanded of university students. Journal editors should make similar demands of those who submit papers to them. And researchers unsure of their own information competencies should enlist collaborators who can contribute their information expertise when a study requires it.

REFERENCE

DE GROOTE, S.L. & DORSCH, J.L. (2003). **Measuring use patterns of online journals and databases.** *Journal of the Medical Library Association*, 91, 231-241.

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