Report from the Childress Summit of the Pediatric Trauma Society, April 22–24, 2013

Barbara A. Gaines, MD, Kristine Hansen, RN, Chris McKenna, MSN, CRNP, Maria McMahon, PNP-PC/AC, EMT-B, J. Wayne Meredith, MD, David P. Mooney, MD, MPH, Sally K. Snow, RN, CPEN, FAEN, Jeffrey S. Upperman, MD,
for the **Childress Summit of the Pediatric Trauma Society Work Groups**

The summit attendees were divided into four thematically focused work groups as follows: emergency medicine/critical care/resuscitation, general trauma, neurotrauma/traumatic brain injury, and trauma systems. Each work group identified strengths, weaknesses, opportunities, and threats specific to their topic before the summit convened. Once the summit began, each work group met in concurrent breakout sessions to identify challenges and opportunities to improve pediatric trauma care. The groups then reconvened; ideas from each group were shared and discussed among all participants. White papers generated by each group after the summit form the basis of this combined report.

(*J Trauma Acute Care Surg*. 2014;77: 504–509. Copyright © 2014 by Lippincott Williams & Wilkins)

Pediatric trauma care is a separate and distinct entity from adult trauma care, and it continues to evolve as a discipline. However, it remains true that 30% of children in the United States lack prompt access to pediatric trauma care.[1] Furthermore, nearly 90% of pediatric trauma patients do not receive care at a pediatric trauma hospital.[2] One major factor may be the shortage of hospitals that provide trauma care for children. According to the American College of Surgeons, while there are 109 adult Level 1 trauma centers in the United States, there are only 44 Level 1 pediatric trauma centers (http://www.facs.org/trauma/verified.html). Most injured children are not treated in pediatric trauma centers because of the geographically limited distribution of such specialized care and the lack of pediatric surgeons and other appropriate specialists.[3,4]

CURRENT STATE OF KNOWLEDGE

The Institute of Medicine has published two reports[5,6] regarding emergency care for children, and other policy groups, such as the American Academy of Pediatrics and the Emergency Medical Services for Children (EMSC) National Resource Center,[7] have developed consensus guidelines. Nonetheless, four problems identified by all work groups were (*a*) inconsistent application of extant guidelines across states, (*b*) lack of knowledge of current guidelines outside the pediatric trauma community, (*c*) inconsistent findings in the work done to date (e.g., see Notrica et al.[8]), and (*d*) a limited amount of evidence-based research from which new metrics and policies could be created.

From the Children's Hospital of Pittsburgh of University of Pittsburgh Medical Center (B.A.G., C.M.), Pittsburgh, Pennsylvania; Children's Hospital of Colorado (K.H.), Aurora, Colorado; Boston Children's Hospital (M.M., D.P.M.), Boston, Massachusetts; Wake Forest School of Medicine (JWM), Winston-Salem, North Carolina; Cook Children's Medical Center (S.K.S.), Fort Worth, Texas; and Children's Hospital of Los Angeles (J.S.U.), Los Angeles, California.
Address for reprints: J. Wayne Meredith, MD, Department of Surgery, Wake Forest School of Medicine, Medical Center Blvd, Winston-Salem, NC 27157; email: merediw@wakehealth.edu.

DOI: 10.1097/TA.0000000000000395

The Childress Summit of the Pediatric Trauma Society took place April 22–24, 2013, at the Graylyn International Conference Center at Wake Forest University in Winston-Salem, North Carolina. The Summit brought together 56 nationally recognized pediatric trauma experts from multiple specialties to discuss the most pressing issues and priorities in the field. The overall goal of the Summit was to define and develop a set of priorities to guide future research and policy concerning pediatric trauma care. This framework included strategies to increase awareness of the issues in public and private sectors, thereby increasing support for research and programs in pediatric trauma care.

Pediatric trauma patients have a much lower mortality rate than their adult counterparts (2.1% vs. 3.8%, as reported in the 2012 National Trauma Data Bank).[9] While certainly desirable, lower mortality rates (and lower rates of complications and comorbidities) make the identification of outcome measures challenging; thus, a strength creates a weakness. Similarly, while the presence of pockets of expertise in pediatric trauma care (e.g., posttraumatic stress, injury prevention)[10–14] is laudable, the dissemination of this information and expertise to providers is incomplete.

Previous work has documented that evidence-based practice[15,16] improves trauma outcomes. Furthermore, there is evidence that implementation of a state or regional pediatric trauma system reduces in-hospital mortality for patients with severe trauma.[17,18] The management of traumatic brain injury (TBI), which necessitates coordinated multispecialty care, offers a valuable perspective on structural problems that impede care delivery and implementation of clinical guidelines.[19] Such work could serve as a template for future initiatives to improve pediatric trauma care.

RECOMMENDATIONS FOR FUTURE ACTION

Each of the four work groups provided recommendations, many of which had common themes. Better use of technology and incorporating these new methods as they become available

Copyright © 2014 Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

TABLE 1. Potential Technology to Advance the Optimal Care of Injured Children

Clinical decision support, biomarkers, and new imaging tools to reduce radiation exposure.
Biomarkers to help screen injured children to predict injuries, provide prognosis, and determine need for imaging.
Development and use of blood substitutes to reduce transfusion needs.
"Smart cars" that provide accurate and necessary monitoring of injured children following motor vehicle collisions.
Development of smart phone applications for EMS personnel, to provide on-scene decision support.

were a cross-cutting theme. Table 1 highlights some of these technology-dependent ideas, which involve various specialties and tools.

Another cross-cutting theme was an identified need to develop and implement evidence-based clinical guidelines for assuring optimum care of injured children throughout the continuum of care. These are posited to lead to additional calibrations to pediatric care and to reduce diagnostic and treatment redundancy and other costly variations in care. However, at present, it is widely recognized that high-quality randomized clinical trials—required to create credible evidence-based guidelines—remain difficult to conduct for several reasons (e.g., the relatively few pediatric trauma patients at a given site, differences in state emergency medical service [EMS] systems), in addition to the lack of pediatric trauma clinical guidelines.

A number of more specific recommendations—some of which include the concepts just noted earlier—are listed in the following sections. Each one includes possible strategies and projected results.

Recommendation

Create a comprehensive set of pediatric-specific outcome measures, including TBI.

Results

Standardized outcomes would allow providers and other stakeholders to objectively measure efficacy of currently used treatment strategies and report them in the literature. These measures could also help identify areas of improvement for individual centers or practitioners. Follow-up and tracking adherence to recommendations would increase the relevance of such an outcomes registry.

Strategies

One relevant model is the National Surgical Quality Improvement Program, whose member hospitals have demonstrated a reduction in complications and mortality.[20] A pediatric version of the Trauma Quality Improvement Program is in the early phases. This initiative may help address deficiencies in knowledge and codify best practices for accurate data capture.

Recommendation

A national "needs assessment" should be completed to evaluate geographic distribution of children, frequency and types of pediatric injuries in individual communities, and availability and access to pediatric care resources. This assessment could build on the EMSC Performance Measures operative in most states, which capture data on pediatric trauma center capabilities, ambulance equipment specific to children, transfer agreements and protocols between hospitals, and emergency department readiness to care for children. A national needs assessment could identify both existing gaps in providing pediatric trauma care and assets and resources at the community level. See Table 2 for examples of possible questions that could be asked in such a needs assessment.

Results

Gaps identified in this assessment would assist decision makers (e.g., in government, EMS systems, and hospital administration) to (*a*) raise awareness, both of existing and needed evidence-based guidelines for pediatric trauma systems; (*b*) incorporate initial resuscitation and injury care through rehabilitation as well as community and school reintegration; and (*c*) incorporate prevention activities.

Strategies

Facilitate national-level reporting of pediatric trauma data by (*a*) inviting states to review their data before a national-level report is issued, (*b*) reporting only aggregated data in the national report, and (*c*) using a mutually agreed-upon and politically neutral group to perform the assessment. Providing technical assistance to states would allow them to plan and implement needed programs, saving them time and resources.

Recommendation

Create a Virtual Pediatric Trauma Center (VPTC), to help practitioners care for injured children in locations remote from tertiary care. VPTC resources might include discussion of management, telemedicine, and review of procedures to troubleshoot problems.

TABLE 2. Questions to Explore With Stakeholders in Needs Assessments

Does your state have a state trauma system?
Do specific rules and regulations guide your system? Do these rules and regulations address care of pediatric trauma patients?
Are specific trauma centers recognized for children?
Is there a tiered center of trauma center care in your state? How many levels?
Are there enough facilities of different levels to meet local needs of severely injured children?
Does your state have a specific plan to monitor compliance of trauma center care and transfer of pediatric patients?
What are the transfer patterns for care of injured children? Are the right pediatric patients being transported to the right facilities?
Do EMS providers follow specific destination protocols for injured children in your state?
Does the state have a performance/quality improvement plan for trauma? Are there indicators specific for children? If so, what are they?
Are any rehabilitation centers in your state designated for children? Are these standalone facilities or part of another hospital?
Are there enough facilities of different levels to meet local needs of severely injured children?
Do facilities have enough health care workers with the appropriate skills and training to provide pediatric trauma care?
Are children with head injuries required to have a back-to-school reintegration plan?

© 2014 Lippincott Williams & Wilkins

Copyright © 2014 Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

TABLE 3. Criteria for Posttraumatic and Acute Stress Disorders (adapted from Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition)

Potentially traumatic exposure	Criterion A: exposure to actual or threatened death, serious injury, or sexual violation in one (or more) of the following ways:
	Directly experiencing the traumatic event(s)
	Witnessing, in person, the event(s) as it occurred to others
	Learning that the event(s) occurred to a close family member or close friend
	Experiencing repeated or extreme exposure to aversive details of the traumatic event(s)
Traumatic symptoms associated with the traumatic event(s)	Criterion B: Reexperiencing or intrusive symptoms (e.g., distressing memories, dreams, reactions or flashbacks, intensive physiologic distress with cues that symbolize the event)
	Criterion C: persistent avoidance of stimuli (e.g., avoiding memories, thoughts or feelings or avoiding external reminders—people, places, conversations, activities, objects, situations)
	Criterion D: persistent negative alterations in cognition or mood (e.g., amnesia for aspects of the event; negative beliefs or expectations about oneself, others, the world; distorted cognitions about the cause of the event; fear, horror, anger, guilt or shame; diminished interest in activities; detached or estranged feelings; inability to experience positive emotion)
	Criterion E: Hyperarousal and reactivity (e.g., irritability, anger, recklessness, self-destructive behaviors, hypervigilance, exaggerated startle, or sleep disturbance)
Posttraumatic stress disorder [309.81 (F43.10)]	Duration of the disturbance and Criteria B–E for >1 mo
	Disturbance causes clinically significant distress or impairment in social, occupational, or other functioning
	Disturbance is not attributable to the physiologic effects of a substance or another medical condition
	Note specific criteria for children younger than age 6 years
Acute Stress Disorder [308.3 (F43.0)]	Symptoms similar to those of posttraumatic stress disorder:
	Intrusive thoughts, negative mood, dissociation, avoidance, hyperarousal
	Duration of the disturbance and Criteria B–E for 3 d to 1 mo after trauma exposure and lasts for at least 3 d
	Disturbance causes clinically significant distress or impairment in social, occupational, or other functioning
	Disturbance is not attributable to the physiologic effects of a substance or another medical condition (e.g., mild TBI) and is not better explained by brief psychotic disorder

Results

The VPTC could improve the quality of injury care in areas with limited pediatric-specific manpower or equipment and could provide a safety net for critical access providers with limited local resources.

Strategies

A "proof of concept" approach would first determine patterns such as volumes of care, outcomes, and resource use. (The needs assessment proposed earlier could help in such determinations.) This initial information would help determine issues such as ideal location of VPTC resources, whether to regionalize, and how to remain financially viable. Medicolegal and regulatory issues would need to be addressed. To enable the VPTC to operate nationally, an appropriate credentialing system would be needed for practitioners. Poison control centers, which use a concept akin to the VPTC, could be a helpful model.

Recommendation

Create a Pediatric Trauma Toolkit, a ready resource to develop and distribute educational tools and clinical practice guidelines for better management of pediatric trauma patients.

Results

Such a resource—perhaps building on the work already facilitated by Health Resources and Services Administration—would help eliminate existing variability in pediatric injury care worldwide. The toolkit could potentially drive collaborations between practitioners to develop consensus guidelines for clinical care. It could minimize the need to repeat efforts (e.g., creation of transfer guidelines where examples exist) and allow time to be devoted to new endeavors.

Strategies

This resource would be readily (and ideally freely) available online and include items specific to clinical management (e.g., evidence-based guidelines), guides to establish or optimize treatment facilities (e.g., trauma flow sheets, transfer guidelines), and infrastructure development (e.g., quality improvement program design, registrar needs). Such a toolkit would need a robust and routine performance improvement process to insure the quality of recommendations and regular review to ensure that guidelines remained current and relevant. The use of toolkit items such as guidelines could be tied to incentives to increase adoption and implementation.

Recommendation

Place a greater emphasis on the family during and after hospitalization, to mitigate the stress of pediatric trauma injury and care.

Strategies

Add early comprehensive psychosocial screening and assessment of both children and families[21] into existing care plans. Use principles of "trauma-informed care"; this includes integrating basic knowledge about psychological trauma into practice, delivering care that minimizes the potential to newly traumatize patients or families, and incorporating screening for traumatic stress to determine when more help is needed. The Center for Pediatric Traumatic Stress has an online toolkit for providers (www.HealthCareToolbox.org) to promote standardized strategies. (See Table 3 for assessment criteria for

© 2014 Lippincott Williams & Wilkins

Copyright © 2014 Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

posttraumatic and acute stress disorders.) Including families in the care process as much as possible will require buy-in from practitioners. Resources will be needed to insure appropriate follow-up and strategies for return to school or work. Prioritizing school and/or work reentry plans would facilitate successful reintegration into the community.

Results

Enhanced incorporation of families, such as family presence in trauma resuscitation, would benefit both patients and parents.[22] Prioritizing school and/or work reentry plans would facilitate successful reintegration into the community and decrease family stress after hospitalization. Such an approach to trauma care would likely reduce long-term costs (perhaps offsetting the cost of such programs) and reduce the incidence of potentially debilitating posttraumatic stress disorders in children and their families.[23]

Recommendation

Translate lessons learned in the military medical system regarding treatment of pediatric noncombatants—who account for 5% to 15% of those cared for by military personnel[24,25]—into civilian trauma care.

Strategies

Existing predeployment training of physicians could be augmented with pediatric care. A network of pediatric providers could be assembled to consult with combat surgical hospitals. Web-based resources to supplement care in the field could be valuable.[26] Civilian pediatric trauma care providers could provide continuity of care for injured children once they were transferred.

Results

An improved understanding of blast injury (e.g., as seen in the Boston Marathon bombing) would be beneficial for civilian providers. Concepts relevant to children would be available to add to existing trauma triage and mass casualty incident management. Uncommon issues in civilian pediatric trauma practice (e.g., vascular injuries, mangled extremities, or the need for massive transfusion) are more prevalent in the military; translation of those skills to civilian colleagues is vital. Finally, improvements in forward care (prehospital) in the military may translate into successes in the civilian arena.

Recommendation

Create a Pediatric TBI Consortium

Strategies

A multidisciplinary consortium could be modeled after the pediatric cancer treatment networks, thereby solving the dilemma of limited cases. The Pediatric Emergency Care Applied Research Network (PECARN)[27] could provide a starting point.

Results

Such a consortium could provide a needed infrastructure for best practices, drive advancement of science and advocacy, create a mechanism for protocol standardization, and promote larger trials within extant funding mechanisms.

Recommendation

Create a national TBI research database to permit (*a*) input of laboratory data, imaging, and bedside biometric monitoring; (*b*) allow cross-boundary integration of information in artificial intelligence systems; and (*c*) generate outputs that identify outcomes, facilitate timely clinical management, and provide objective evidence of response to therapeutic interventions.

Strategies

The Virtual Physiological Human Project is an example of worldwide cooperation across data platforms. Data elements have already been defined by the National Institutes of Health Common Data Element process and are mandated for use in TBI research. The American College of Surgeons, which controls the National Trauma Data Bank, could be approached about the development of a brain injury module to be used for all ages. Industry partners may also be useful.

Results

A unified data repository for TBI—with quality controls and confidentiality in place—would make possible the needed standardization for pediatric TBI measures.

Recommendation

Educate stakeholders about how guidelines can improve processes and outcomes.

Strategies

Ideas for projects to inform political leaders include the following:

- Provide a national "report card" on the status of pediatric trauma systems to enhance and inform future research. A national position paper for stakeholder groups (e.g., the National Governors Council) could outline components of an effective pediatric trauma system.
- Provide a report card for each state listing current strengths and weaknesses. This report could inform political leaders on how best to improve processes for pediatric trauma care and potentially redistribute resources.
- Provide data for national programs (e.g., Emergency Medical Services for Children) to help them better integrate emergency trauma care needs of children across states.

UNREALIZED GOALS

A number of initiatives mentioned in the recommendations depend on accomplishing goals that have not yet been met. Some of these goals include the following:

- Recognition of pediatric trauma as an independent discipline with unique concerns.
- Development of a national data set that tracks injured children.

© 2014 Lippincott Williams & Wilkins

Copyright © 2014 Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

- Creation of training programs to educate practitioners about TBI; this step awaits development of consensus regarding classification, evaluation, and treatment of TBI in children.
- Improvement of collaborative professional relationships and transition planning; these must include the medical home, family support systems, school systems, and community partners.
- Equitable access to current resources; this will require changes in public policy, universal health care, accountable care organizations, and bundled care that include the continuum of care.
- A multipronged approach in virtual health care—telemedicine, electronic medical records, licensing that allows cross-state practice; this will be needed to accomplish several of the recommendations mentioned earlier.
- More basic science and translational models in TBI; these are needed to enhance understanding of the developing brain. They are essential to train young scientists and support established investigators in TBI models that include multiple species and to develop more clinically relevant models that mimic humans.
- More funding; for any of these initiatives to occur, more funding is needed from a variety of sources.

IMPLEMENTATION

An implementation plan to accomplish the goal of improved pediatric trauma care can (and should) encompass a number of different strategies. Among many possible strategies, the work groups identified the following:

- Partnering with professional organizations with a stake in health care funding (i.e., American Association of Pediatrics, American College of Surgeons, etc.)
- Creating federal or other funding opportunities to explore the role of trauma systems within health care reform or to provide support for other types of projects such as those described in this report
- Capturing and publicizing anecdotal examples of cost savings made possible by guideline implementation
- Unifying processes for mandating, reporting, and sharing data (including autopsy data) that meet legal and regulatory requirements
- Promoting the societal gains from pediatric trauma system implementation—not just fewer hospital deaths but increased years of productive life gained by children when they receive care within a trauma system.

SUMMARY

The Childress Summit attendees identified a number of ideas to improve the current state of knowledge regarding pediatric trauma care. These collaborative, multidisciplinary exchanges of ideas will continue at the Pediatric Trauma Society's first annual meeting (November 2014) and be revisited at the next Childress Summit planned for 2015.

WORK GROUP PARTICIPANTS

Emergency medicine/critical care/resuscitation: J. Michael Dean, MD, MBA (group leader); Sally Jo Zuspan, RN, MSN (group leader); Deena Brecher, MSN, RN; Ralph B. D'Agostino, Jr., PhD; Richard A. Falcone, MD, MPH; Lisa Gray, RN, BSN; Toni K. Gross, MD, MPH; Nathan Kuppermann, MD, MPH; Valerie Maholmes, PhD, CAS; Milan D. Nadkarni, MD; Lou Romig, MD, FAAP; Flaura K. Winston, MD, PhD; Joseph L. Wright, MD, MPH. General trauma: Lynn Haas, RN, MSN (group leader); Michael L. Nance, MD, FACS (group leader); Nancy Kassam-Adams, PhD; Laura D. Cassidy, MS, PhD; Mary J. Edwards, MD, FACS; Martin R. Eichelberger, MD; Jonathan I. Groner, MD; Kathy Haley, RN, BSN; Karen Potvin Klein, MA; Thomas Pranikoff, MD, FACS; Steven Stylianos, MD; Joseph J. Tepas, III, MD, FACS.
Neurotrauma and traumatic brain injury: Mary E. Fallat, MD, FACS (group leader); Melissa Harte, MS, RN (group leader); P. David Adelson, MD, FACS; Michael J. Bell, MD; Rachel P. Berger, MD, MPH; Gerard Anthony Gioia, PhD; Diana Kraus, RN, BSN; Marilyn Lash, MSW; Laurie A. Molloy, MBA; Alexander K. Powers, MD; Robert C. Tasker, MD, MBBS; Keith O. Yeates, PhD. Trauma systems: Ellen J. MacKenzie, PhD (group leader); N. Clay Mann, PhD, MS (group leader); Randall S. Burd, MD, PhD; Arthur Cooper, MD; Drew Dawson; Diana G. Fendya, RN, MSN(R); Susan S. Gallagher, MPH; Alison R. Gardner, MD; Graydon (Gregg) C. Lord, MS, NREMT-P; Donna Ojanen Thomas, RN, MSN; Ginger G. Wilkins, RN, MSN.

ACKNOWLEDGMENT

The Childress Summit of the Pediatric Trauma Society was supported by the Childress Institute for Pediatric Trauma, Winston-Salem, NC.

DISCLOSURE

The authors declare no conflicts of interest.

REFERENCES

1. Nance ML, Carr BG, Branas CC. Access to pediatric trauma care in the United States. *Arch Pediatr Adolesc Med*. 2009;163:512–518.
2. Densmore JC, Lim HJ, Oldham KT, Guice KS. Outcomes and delivery of care in pediatric injury. *J Pediatr Surg*. 2006;41:92–98.
3. Petrosyan M, Guner YS, Emami CN, Ford HR. Disparities in the delivery of pediatric trauma care. *J Trauma*. 2009;67:S114–S119.
4. Lorch SA, Myers S, Carr B. The regionalization of pediatric health care. *Pediatrics*. 2010;126:1182–1190.
5. Durch JS, Lohr KN, (Eds). *Institute of Medicine Report: Emergency Medical Services for Children*. Washington, DC: National Academies Press; 1993.
6. Institute of Medicine Committee on the Future of Emergency Care in the US Health System. *Emergency Care for Children: Growing Pains*. Washington, DC: National Academies Press; 2006.
7. Fendya D, Patel R, Belli K, Jayawardena G, Quinata-Morrison T, Hulbert J, Singh T, Sellman S (ed). Best Practices: A Guide for State Partnership Grantees on the Implementation of the EMSC Performance Measures. Washington, DC: Emergency Medical Services for Children (EMSC) National Resource Center (pub.) 2009.
8. Notrica DM, Weiss J, Garcia-Filion P, Kuroiwa E, Clarke D, Harte M, Hill J, Moffat S. Pediatric trauma centers: correlation of ACS-verified trauma centers with CDC statewide pediatric mortality rates. *J Trauma Acute Care Surg*. 2012;73:566–572.
9. National Trauma Data Bank 2012 Annual Report. American College of Surgeons. Available at: http://www.facs.org/trauma/ntdb/pdf/ntdb-annual-report-2012.pdf. Accessed May 15, 2014.
10. Kassam-Adams N, Marsac ML, Hildenbrand A, Winston F. Posttraumatic stress following pediatric injury: update on diagnosis, risk factors, and intervention. *JAMA Pediatr*. 2013;167:1158–1165.
11. Marsac ML, Hildenbrand AK, Kohser KL, Winston FK, Li Y, Kassam-Adams N. Preventing posttraumatic stress following pediatric injury: a randomized controlled trial of a web-based psycho-educational intervention for parents. *J Pediatr Psychol*. 2013;38:1101–1111.
12. Martin-Herz SP, Zatzick DF, McMahon RJ. Health-related quality of life in children and adolescents following traumatic injury: a review. *Clin Child Fam Psychol Rev*. 2012;15:192–214.

© 2014 Lippincott Williams & Wilkins

Copyright © 2014 Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

13. Durbin DR, ; Committee on Injury, Violence, and Poison Prevention. Child passenger safety. *Pediatrics*. 2011;127:e1050–e1066.
14. Kendrick D, Young B, Mason-Jones AJ, Ilyas N, Achana FA, Cooper NJ, Hubbard SJ, Sutton AJ, Smith S, Wynn P, et al. Home safety education and provision of safety equipment for injury prevention. *Cochrane Database Syst Rev*. 2012;9.
15. Rice TW, Morris S, Tortella BJ, Wheeler AP, Christensen MC. Deviations from evidence-based clinical management guidelines increase mortality in critically injured trauma patients. *Crit Care Med*. 2012;40:778–786.
16. Watters W. Defining evidence-based clinical practice guidelines. *AAOS Now*. 2008;7. Available at: http://www.aaos.org/news/aaosnow/jul08/research2.asp.
17. Curry JI, Reeves B, Stringer MD. Randomized clinical trials in pediatric surgery: could we do better?. *J Pediatr Surg*. 2003;38:556–559.
18. Hulka F. Pediatric trauma systems: critical distinctions. *J Trauma*. 1999; 47:S85–S89.
19. Potoka DA, Schall LC, Gardner MJ, Stafford PW, Peitzman AB, Ford HR. Impact of pediatric trauma centers on mortality in a statewide system. *J Trauma*. 2000;49:237–254.
20. Hall BL, Hamilton BH, Richards K, Bilimoria KY, Cohen ME, Ko CY. Does surgical quality improve in the American College of Surgeons National Surgical Quality Improvement Program. *Ann Surg*. 2009;205:363–376.
21. Kassam-Adams N, Garcia-Espana JF, Marsac M, Lohser K, Baxt C, Nance ML, Winston FK. A pilot randomized controlled trial assessing secondary prevention of traumatic stress integrated into pediatric trauma care. *J Trauma Stress*. 2011;24:252–259.
22. Boudreaux ED, Francis JL, Lovacano T. Family presence during invasive procedures and resuscitations in the emergency department: a critical review and suggestions for future research. *Ann Emerg Med*. 2002;40: 193–205.
23. Zatzick D, Jurkovich GJ, Fan MY, Grossman D, Russo J, Katon W, Rivara FP. Association between posttraumatic stress and depressive symptoms and functional outcomes in adolescents followed up longitudinally after injury hospitalization. *Arch Pediatr Adolesc Med*. 2008;162:642–648.
24. Borgman M, Matos RI, Blackbourne LH, Spinella PC. Ten years of military pediatric care in Afghanistan and Iraq. *J Trauma Acute Care Surg*. 2012;73(6 Suppl 5):S509–S513.
25. Ramasamy A, Hinsley DE, Edwards DS, Stewart MP, Midwinter M, Parker PJ. Skill sets and competencies for the modern military surgeon: lessons from UK military operations in Southern Afghanistan. *Injury*. 2010;41: 453–459.
26. Fuenfer MM, Spinella PC, Naclerio AL, Creamer KM. The U.S. military wartime pediatric trauma mission: how surgeons and pediatricians are adapting the system to address the need. *Mil Med*. 2009;174:887–891.
27. The Pediatric Emergency Care Applied Research Network. The Pediatric Emergency Care Applied Research Network (PECARN): rationale, development, and first steps. *Acad Emerg Med*. 2003;10:661–668.

© 2014 Lippincott Williams & Wilkins

Copyright © 2014 Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.