AMERICAN ACADEMY OF PEDIATRICS

CLINICAL REPORT

Guidance for the Clinician in Rendering Pediatric Care

William T. Zempsky, MD; Joseph P. Cravero, MD; and the Committee on Pediatric Emergency Medicine and Section on Anesthesiology and Pain Medicine

Relief of Pain and Anxiety in Pediatric Patients in Emergency Medical Systems

ABSTRACT. Whether a component of a disease process, the result of acute injury, or a product of a diagnostic or therapeutic procedure, pain should be relieved and stress should be decreased for pediatric patients. Control of pain and stress for children who enter into the emergency medical system, from the prehospital arena to the emergency department, is a vital component of emergency care. Any barriers that prevent appropriate and timely administration of analgesia to the child who requires emergency medical treatment should be eliminated. Although more research and innovation are needed, every opportunity should be taken to use available methods of pain control. A systematic approach to pain management and anxiolysis, including staff education and protocol development, can have a positive effect on providing comfort to children in the emergency setting. ***Pediatrics*** **2004;114:1348–1356;** ***pain, stress, anxiety, analgesia, opiates, topical anesthesia.***

ABBREVIATIONS. ED, emergency department, EMS, emergency medical services, EMLA, eutectic mixture of local anesthetics, LMX_4, liposomal 4% lidocaine cream, LET, lidocaine, epinephrine, and tetracaine, AAP, American Academy of Pediatrics, ASA, American Society of Anesthesiologists, NPO, nil per os.

BACKGROUND

A systematic approach to pain management is required to ensure pain relief for children who enter into the emergency medical system, which includes all emergency medical transport systems as well as the emergency department (ED). Over the past 20 years, improvements in the recognition and treatment of pain in children have led to changes in the approach to pain management for acutely ill and injured pediatric patients. Studies have shown an increase in opiate use in children with fractures.[1–3] However, there is still progress to be made; the administration of analgesia in children varies by age and lags behind adults, and our youngest patients are at the highest risk of receiving inadequate analgesia.[1–4] There is also wide variation in pain management practice by different EDs and health care professionals; in some settings, analgesics are underused in the care of children with pain.[2,5]

Inadequate sedation and pain control has negative implications for pediatric patients. Neonates who undergo procedures with inadequate analgesia have long-standing alterations in their response to and perceptions of painful experiences.[6–10] Inadequate pain control during oncology procedures leads to significantly increased pain scores for subsequent painful procedures.[11] Posttraumatic stress disorder can occur after procedures or stressful medical experiences that are not accompanied by appropriate pain control or sedation.[12,13]

Ethnicity affects pain management from both a patient and health care professional perspective. It is clear that ethnicity is an important contributor to an individual's pain perception as well as to manifested behavioral distress and anxiety.[14–17] However, no predictable patterns have emerged in regard to a consistent pain experience within ethnic groups. Studies have noted that Hispanic and black individuals with long-bone fractures were less likely to receive analgesics than were non-Hispanic white individuals.[18,19] A review of the National Hospital Ambulatory Medical Care Survey from 1992 to 1997 demonstrated that among patients with fractures, black children covered by Medicaid were least likely to receive parenteral sedation and analgesia.[20] However, in other studies, analgesic administration was not associated with ethnicity.[21,22] From a health care professional perspective, the clinician's own cultural background and bias may affect the decision of whether to administer analgesics.

A system-wide approach to pain management is required for children who enter into the emergency medical system. Pain management awareness and techniques should be woven into the fabric of the emergency medical system through education, protocol development, and changes in attitudes. The purpose of this report is to provide information to optimize the comfort of children whether they are cared for in the emergency setting or other environments.

STATEMENT OF THE PROBLEM

Barriers in general, as well as those intrinsic to the emergency setting, can affect the provision of ade-

The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

doi:10.1542/peds.2004-1752
PEDIATRICS (ISSN 0031 4005).

quate analgesia.[23–28] The myths that children do not feel pain the same way adults do and that pain has no untoward consequences in children still exist.[28] Children's pain is underestimated because of a lack of adequate assessment tools and the inability to account for the wide range of children's developmental stages. Pain is often undermedicated because of fears of oversedation, respiratory depression, addiction, and unfamiliarity with use of sedative and analgesic agents in children.

In the ED, children often present with a constellation of symptoms but no final diagnosis; they are usually unknown to the treating clinician, have a wide range of medical or surgical problems, and are unlikely to be fasting on arrival.[24] These factors make their assessment and the selection of appropriate analgesic intervention more complicated. As well, the emergency setting can be a busy, fast-paced environment in which heightened patient and parental anxiety increases the perception of pain and makes its treatment more difficult.[25]

Analgesic agents typically used for pain in other settings might not be used in the ED because of concerns regarding masking of symptoms and prevention of appropriate diagnoses. Topical anesthetics may be underused because of concerns regarding delay in definitive treatment, cost, or lack of availability.

Until recently, education in pain management was not emphasized for clinical staff.[29,30] Optimal pain management requires a thorough understanding of pain assessment and management strategies.[25,26] Prehospital providers typically receive inadequate pain management instruction,[31,32] and pain management has received little emphasis in undergraduate or graduate medical education.[33–37]

NEW INFORMATION

Prehospital Care

The development of pain assessment and management protocols specifically for prehospital providers, along with educational initiatives, can improve pain management in the field.[31,38] Several adult studies[39–41] and 1 pediatric trial[42] show that analgesics such as opiates and tramadol hydrochloride can be used in prehospital protocols to decrease pain scores without causing respiratory depression. Alternative delivery systems, such as inhaled nitrous oxide, could offer pain control without requiring intravenous access, providing advantages in the field as well as in the hospital setting.[43–47] Some systems have implemented a "toolbox" of distraction equipment on emergency medical services (EMS) units as an adjunct to providing pain relief in the anxious, uncomfortable child.

Assessment and Management of Pain, Stress, and Anxiety in the ED

The Environment

The creation of an appropriate environment is essential to minimize the pain and distress of a child's ED visit.[25] Ideally, each child should be placed in a private room.[25] This room should provide a child-friendly, calming environment.[24] Colorful walls, pictures on the ceiling, and a collection of toys and games will minimize fear induced by this strange setting.[25]

Nonpharmacologic or stress management and emotional support are essential to providing a comfortable environment for the child. Distraction can range from simple techniques, such as a bubble blower or pinwheel used by the child during a painful injection, to structural changes, such as outfitting each procedure room with video cassette players to provide music and distraction stations equipped with bubble columns, light wands, and imagery projectors.[48–52] Training the staff in distraction and imagery increases the use of these techniques.[53]

A child life specialist based in the ED has the ability to (1) decrease anxiety and pain perception, (2) teach the child and staff simple distraction techniques, and (3) support family involvement in the child's care.[54,55] The child life specialist has an important role; he or she is one of a few professionals in the emergency setting who is not in a position to cause emotional or physical pain to the child.[56,57]

Allowing (but not requiring) family presence during painful procedures will also be of benefit. Although there is no evidence that family presence decreases pain, their presence for procedures does decrease parental and child distress.[58–61] Family presence does not increase anxiety of the child or decrease the procedure success rate of experienced clinicians.[58,59]

Pain Assessment in the ED

Assessment is the first step in the recognition and treatment of pain.[26,30] Assessment should begin at the triage desk, the entry point to all EDs, allowing triage to become the focal point for improving pain management.[25,26] The Joint Commission on Accreditation of Healthcare Organizations standards include mandatory pain assessments for all hospital patients.[30] Pain should be assessed routinely, along with vital signs, and reassessed during the ED stay. Pain should be monitored, and intervention should be begun and modified as the clinical situation demands.

The clinical standard for pain assessment is a self-report scale. Several well-validated scales exist for children as young as 3 years to report their own pain level.[62–64] The Wong-Baker Faces scale and the 10-cm Visual Analog Scale have been used successfully in many EDs caring for children.[62,64] For those who are unable to use self-report scales, behavioral scales can be combined with an evaluation of the patient's history and physical findings to assess the level of a child's pain.[65–67]

Children with severe pain require immediate triage, pain assessment, and pain treatment.[68] Patients with less acute conditions should also receive analgesia.[69] Treating pain in patients with less acute conditions does not interfere with physical examination or diagnosis. Protocols should be developed to allow for the delivery of appropriate medications such as acetaminophen, ibuprofen, or oral opiates to these patients (Table 1).

TABLE 1. Triage Oral Analgesic Administration Guidelines

Purpose
- To provide analgesic therapy to patients presenting to triage with a complaint of pain

Procedure
1. Pain assessment
2. Immediate triage to department for all those with severe pain as assessed by triage nurse and consideration of pain score
3. For those not requiring immediate evaluation with pain score >3 (0–10 scale) or chief complaint consistent with pain, consider administration of oral analgesic
4. Assess recent analgesic use

Contraindications
1. Allergy to analgesic (consider alternative)
2. NPO status (if patient may require procedural sedation or general anesthesia, consult with a physician before analgesic administration)

Medications
1. Ibuprofen (avoid if the patient has an aspirin allergy, anticipated surgery, bleeding disorder, hemorrhage, or renal disease)
2. Acetaminophen (avoid if the patient has hepatic disease or dysfunction)
3. Acetaminophen with codeine or other oral opiate

TABLE 2. Guidelines for Use of EMLA/LMX_4 in the ED

EMLA/LMX_4 use should be considered in any patient who has a high likelihood of undergoing a nonemergent invasive procedure on intact skin in the ED. These include:
- Intravenous line placement or venipuncture
- Lumbar puncture
- Abscess drainage
- Joint aspiration

Discussion with parents should bring up these issues:
- EMLA/LMX_4 does not provide complete pain relief
- Some patients may require a procedure before EMLA/LMX_4 reaches its full effectiveness (see below)

Contraindications
- Emergent need for intravenous access
- Allergy to amide anesthetics
- Nonintact skin
- Recent sulfonamide antibiotic use (trimethoprim-sulfamethoxazole, erythromycin-sulfisoxazole) (EMLA only)
- Congenital or idiopathic methemoglobinemia (EMLA only)

The EMLA dose should be lower for patients <12 months old or weighing <10 kg

Placement of EMLA/LMX_4
- Intravenous line placement
  - EMLA/LMX_4 should be placed in at least 2 sites over veins amenable to placement of an intravenous line as judged by the triage nurse.
  - EMLA reaches full effectiveness in 1 h; LMX_4 reaches full effectiveness in 30 min
  - Care should be taken to avoid mucous membrane contact or ingestion
- Lumbar Puncture
  - Placement of EMLA/LMX_4 for lumbar puncture should be considered at triage; accurate placement requires consultation with the attending physician

TABLE 3. Triage Guidelines for Use of LET (a Topical Anesthetic for Open Wounds)

Eligibility
- Simple lacerations of the head, neck, extremities, or trunk <5 cm in length

Contraindications
- Allergy to amide anesthetics
- Gross contamination of wound
- Involvement of mucous membranes, digits, genitalia, ear, or nose

Procedure
- LET should be placed according to standard ED procedure; time of placement should be documented on triage sheet
- Maximum wound length: 5 cm; maximum dose: 3 mL
- (1) Place 3 mL of LET mixed with cellulose on open wound and cover with occlusive dressing or (2) place cotton ball soaked with LET solution into wound

Triage should be used as an opportunity to predict the future pain medication needs of the ED patient. For example, in 1 inner city pediatric ED, 90% of patients requiring intravenous access did not undergo this procedure until at least 60 minutes after triage.[70] A prediction model could be developed whereby the patient's chief complaint and medical history, combined with an experienced triage nurse assessment, could determine with some accuracy which patients have a high probability of needing intravenous access, and these patients could receive topical anesthetic application at triage.[71] These findings could be adapted to develop topical anesthetic protocols for painful procedures in other emergency centers, taking into account their patient volume, acuity, and flow characteristics (Table 2). Similar protocols should be developed for topical anesthetic placement for laceration repair at triage (Table 3).

Controlling Pain Related to Minor Procedures

Topical anesthetics can be placed proactively as described previously to control the pain associated with minor procedures. Procedures can be delayed in some cases in which topical anesthetic is not placed proactively. Some topical anesthetics have been developed that produce anesthesia more rapidly than eutectic mixture of local anesthetics (EMLA [AstraZeneca, Wilmington, DE]). A topical liposomal 4% lidocaine cream (LMX_4 [Ferndale Labs, Ferndale, MI]) provides anesthesia in approximately 30 minutes.[72,73] Lidocaine iontophoresis provides superior anesthesia to EMLA in 10 minutes or less; however, approximately 5% of children find the sensation caused by iontophoretic drug delivery to be unpleasant.[74,75] Vapocoolant sprays that have immediate onset of action can be used successfully for injection pain in children; however, they are not effective for intravenous line placement.[76,77]

Laceration repair should be completed with an emphasis on minimizing pain and anxiety. Several topical anesthetic/vasoconstrictor combinations such as lidocaine, epinephrine, and tetracaine (LET), which can be made by the in-hospital pharmacy as a liquid or gel preparation, provide excellent wound anesthesia in 20 to 30 minutes.[78,79] EMLA cream also provides topical anesthesia for laceration repair, although it is not approved by the US Food and Drug Administration for this purpose.[80,81] Tissue adhesives such as octyl cyanoacrylate provide essentially painless closure for low-tension wounds.[82,83] Steri-Strips (3M, St Paul, MN) provide similar painless closure and are less expensive than currently available tissue adhesives.[84] In general, absorbable sutures should be considered for facial wounds that must be sutured to avoid the pain and anxiety produced by suture removal.[85,86]

Lidocaine can be used alone in urgent situations or as an adjunct to topical anesthetics. Lidocaine can be injected in an almost painless manner.[87] This technique includes buffering the anesthetic with bicarbonate, warming the lidocaine before injection, and injecting slowly with a small-gauge needle.[88–92] Lidocaine buffered with bicarbonate made by a pharmacy in advance can be stocked in the ED and will remain stable for up to 30 days.[93,94] Lidocaine injection decreases the pain of venous cannulation without affecting procedural success rate.[87]

Neonatal Pain Management in the ED

Simple changes in practice can minimize painful stimuli for infants. Protocols for topical anesthetic placement should include neonates. Use of EMLA for procedures ranging from circumcision to venipuncture is safe in newborns and even preterm infants.[95–97]

Recent studies have suggested methods by which neonatal distress during painful procedures can be minimized. Sucrose has been found to decrease the response to noxious stimuli such as heel sticks and injections in neonates.[98–101] This effect seems to be strongest in the newborn infant and decreases gradually over the first 6 months of life.[98–101] Nursing protocols that allow for the use of sucrose before painful procedures are in place at many hospitals (Table 4). A 12% to 25% sucrose solution that is made by the pharmacy or is available commercially can be used (Sweet-Ease, Children's Medical Ventures, Norwell, MA). The use of a pacifier alone or in conjunction with sucrose also has been shown to have analgesic effects in neonates undergoing routine venipuncture.[102] Skin-to-skin contact of an infant with his or her mother and breastfeeding during a procedure decrease pain behaviors associated with painful stimuli.[103,104]

Available evidence supports the use of local and topical anesthetic for lumbar puncture in neonates.[105,106] Protocols can allow for the timely placement of topical anesthetic, or injected buffered lidocaine can be used at the site of needle insertion before the procedure. Concerns over the increased difficulty of lumbar puncture after local anesthetic use have proved to be unfounded.[105,107]

Pain can be decreased in neonates by the elimination of heel sticks and intramuscular injections. Venipuncture seems to be less painful than heel lancing for obtaining blood for diagnostic testing.[108] When the intramuscular route is necessary, topical anesthetic should be used if time permits.[109] Use of distraction techniques discussed previously, ice, and less painful injection techniques can also be efficacious.[110–113] The use of lidocaine as the diluent for ceftriaxone can decrease the pain of intramuscular injection.[114]

TABLE 4. Guidelines for Use of Sucrose in the ED

Indications
Use as an adjunct for limiting the pain associated with procedures such as heel sticks, venipuncture, intravenous line insertion, arterial puncture, insertion of a Foley catheter, and lumbar puncture in neonates and infants younger than 6 months
Procedure
1. Administer 2 mL of 25% sucrose solution by syringe into the infant's mouth (1 mL in each cheek) or allow infant to suck solution from a nipple (pacifier) no more than 2 min before the start of the painful procedure
2. Sucrose may be given for >1 procedure within a relatively short period of time but should not be administered more than twice in 1 h
3. Sucrose seems to be more effective when given in combination with a pacifier; nonnutritive suck also contributes to calming the infant and decreasing pain-elicited distress
Contraindications
Avoid use if patient is under NPO restrictions

Does the Appropriate Use of Analgesics Make Evaluation More Difficult?

There is no evidence that pain management masks symptoms or clouds mental status, preventing adequate assessment and diagnosis. For patients with abdominal pain, several adult studies have shown that pain medications such as morphine can be used without affecting diagnostic accuracy.[115–117] A recent pediatric study demonstrates similar findings.[118] Clinical experience suggests that the use of pain medication makes children more comfortable and the examination of the patient's abdomen and diagnostic testing (such as ultrasonography) easier, thus aiding in diagnosis. In the child who has suffered multisystem trauma, small titrated doses of opiates can be used to provide pain relief without affecting the clinical examination or the ability to perform neurologic assessments.[119,120] The development of pain protocols can improve the management of children who suffer major trauma.[121] Regional anesthesia should also be considered for patients who have injuries that are amenable to these techniques.[122,123] Additional studies evaluating these practices in pediatric patients are necessary but should not delay the development of protocols for the use of analgesics in patients with acute abdominal pain and multisystem trauma.

Administration of Pain Medications

Optimal pain management requires expeditious pain assessment and the rapid administration of systemic opioid pain medication to patients in severe pain. This may occur through the intravenous route, which allows for rapid relief of pain and drug titration as necessary and provides a route for other medications. Delivery of pain medications through the intramuscular route is painful both at the time of delivery and for days afterward and does not allow for titration of drug dose. Adjunctive pain medications such as nonsteroidal antiinflammatory drugs (NSAIDS) can be used judiciously in children with pain, acknowledging their known adverse effects such as antiplatelet activity and gastrointestinal and renal toxicity. Oral opiates and NSAIDs are appropriate for mild to moderate pain if the patient has no contraindications to receiving oral medications (ie, potential to require sedation or anesthesia).

Alternative routes of medication administration including oral, intranasal, transdermal, and inhaled should be used whenever possible. Nitrous oxide is a

potent analgesic that does not require venous access and is available in some EDs and EMS systems.[43–47] Nitrous oxide should be used in conjunction with appropriate sedation guidelines and avoided in patients with pneumothorax, bowel obstruction, intracranial injury, and cardiovascular compromise.[46,47] Nitrous oxide has many potential applications including anxiolysis for procedures such as intravenous access and laceration repair and pain control for burn debridement and fracture and dislocation reduction.

Pain medication should be provided in the ED as well as on discharge even for those with mild to moderate pain. Patients should get specific instructions in regard to dose and duration of use. Pain medication should be recommended on an around-the-clock basis for anyone in whom moderate pain is anticipated.

Need for Sedation Policies and Protocols in the ED

The use of sedative hypnotic medication may be required to bring pain and stress levels under adequate control for many procedures in the emergency medical system. Unfortunately, pain and anxiety are often difficult to differentiate in infants and toddlers.

Although many procedures are not intrinsically painful or can be performed painlessly with the use of a topical or local anesthetic, this does not obviate the use of pharmacologic agents to decrease the anxiety and stress in children undergoing procedures in the ED.

Excellent reviews have been published that describe the safe and effective use of sedation in the ED.[124,125] Procedural sedation is generally combined with analgesia to minimize pain whenever the procedure is uncomfortable or painful. Analgesia may take the form of local anesthetics or systemic analgesics. Combinations of medications, particularly the addition of opiates to sedative medications, may increase the risk of respiratory depression and should only be used by individuals trained in airway management and resuscitation.[126]

Although the incidence of serious complications is low, it is imperative to develop ongoing policies that establish close monitoring of these patients. Current guidelines from the American Academy of Pediatrics (AAP), American Society of Anesthesiologists (ASA), and American College of Emergency Physicians[127–130] all recommend a structured evaluation of children that allows risk stratification before beginning sedation. This evaluation should include issues such as preexisting medical conditions, focused airway examination, and consideration of nil per os (NPO) status. Recent data have confirmed the concept that adherence to a structured AAP/ASA-based sedation model can significantly decrease the risk of complications in the pediatric age group.[131]

A critical component of any sedation protocol is to require a trained observer to be solely responsible for monitoring the patient while the procedure is being performed. [128,129,132] In addition, physicians who administer sedation and analgesia should have proven training and skills and ongoing training in the management of pediatric airways and resuscitation.

NPO guidelines for children receiving sedation in the ED are controversial. Many children who receive procedural sedation for emergencies have not fasted in accordance with published guidelines for elective procedures.[133–136] Currently, there are insufficient data to determine the length of time that constitutes safety in regard to NPO status.[134–140] Given the low incidence of adverse events during procedural sedation, larger studies are required to clearly define appropriate NPO duration.

Decisions regarding sedation of a child should be balanced by considering the urgency of the procedure, the effects of prolonged pain and anxiety, the depth and type of sedative and analgesic agents required, inconvenience to the patient and family, and the expenditure of finite ED resources as well as individual patient characteristics. A collaborative pediatric sedation database should be developed to help define the complications associated with these procedures.

Quality Improvement Programs

Any emergency medical system that provides treatment for children should have a demonstrated quality improvement program in which review of sedation and pain management practices in pediatric patients takes place at regular intervals. Transport and prehospital providers are essential components of this ongoing review. Indicators that should be evaluated include compliance with the use of validated pain scores, use of appropriate analgesics for specific disease states (whether severe or mild to moderate pain), use of topical anesthetics and other nonnoxious routes of analgesia and anesthesia, monitoring for adverse outcomes, and the use of discharge instructions that outline the indications, dose, and duration of analgesic to be used.[141–143]

Implementation

A systematic approach to pain management in emergency medical systems requires an implementation strategy advocated by leadership, which should include (1) a comprehensive evaluation of current pain management practices, (2) an educational program regarding pain assessment and management techniques for all clinical staff, (3) the development of protocols to allow the universal and efficient application of pain management strategies and medications, and (4) a quality improvement process to evaluate the ongoing success of the program.[24,26]

CONCLUSIONS

Health care professionals have a duty to provide compassionate care to all children. Pain and sedation management are an important yet complex aspect of emergency care for children. Multiple modalities are now available that allow pain and anxiety control for all age groups. Health care professionals should be aware of all the available analgesic options. Adequate pain assessment is essential for pain relief and should begin on entry into the emergency medical system and continue through discharge of the child from the ED. As medications and technologies

evolve, it is more important than ever that safe sedation protocols and practices are in place for children receiving emergency care.

SUMMARY OF KEY POINTS

1. Training and education in pediatric pain assessment and management should be provided to all participants in emergency medical systems for children.
2. Simple methods for creating favorable environmental conditions for pediatric patients in the EMS setting should be advocated by caregivers.
3. Incorporation of child life specialists and others trained in nonpharmacologic stress reduction should be encouraged.
4. Family presence should be offered as an option during painful procedures.
5. Pain assessment for children should begin at admission to EMS and continue until discharge from the ED. On discharge, patients should receive detailed instruction regarding analgesic administration.
6. Painless administration of analgesics and anesthetics should be practiced when possible.
7. Neonates and young infants should receive appropriate pain relief.
8. Administration of pain medication has not been shown to hinder the evaluation of a possible surgical patient in the ED, and pain medication should not be withheld on this account.
9. Sedation should be provided for patients undergoing painful or stressful procedures in the ED. A structured protocol for pediatric sedation, based on AAP, ASA, American College of Emergency Physicians, and Emergency Medical Services for Children recommendations, should be followed for all children who receive sedative medications in EMS.

REFERENCES

1. Selbst SM, Clark M. Analgesic use in the emergency department. *Ann Emerg Med.* 1990,19:1010–1013
2. Petrack EM, Christopher NC, Kriwinsky J. Pain management in the emergency department: patterns of analgesic utilization. *Pediatrics.* 1997,99:711–714
3. Alexander J, Manno M. Underuse of analgesia in very young pediatric patients with isolated painful injuries. *Ann Emerg Med.* 2003,41:617–622
4. Lewis LM, Lasater LC, Brooks CB. Are emergency physicians too stingy with analgesics? *South Med J.* 1994,87:7–9
5. Krauss B, Zurakowski D. Sedation patterns in pediatric and general community hospital emergency departments. *Pediatr Emerg Care.* 1998,14:99–103
6. Taddio A, Goldbach M, Ipp M, Stevens B, Koren G. Effect of neonatal circumcision on pain response during vaccination in boys. *Lancet.* 1995,345:291–292
7. Taddio A, Katz J, Ilersich AL, Koren G. Effect of neonatal circumcision on pain response during subsequent routine vaccination. *Lancet.* 1997,349:599–603
8. Grunau RE, Whitfield MF, Petrie J. Children's judgments about pain at age 8–10 years: do extremely low birthweight (≤1000 g) children differ from full birthweight peers? *J Child Psychol Psychiatry.* 1998,39:587–594
9. Johnston CC, Stevens BJ. Experience in a neonatal intensive care unit affects pain response. *Pediatrics.* 1996,98:925–930
10. Grunau RV, Whitfield MF, Petrie JH. Pain sensitivity and temperament in extremely low-birth-weight premature toddlers and preterm and full-term controls. *Pain.* 1994,58:341–346
11. Weisman SJ, Bernstein B, Shechter NL. Consequences of inadequate analgesia during painful procedures in children. *Arch Pediatr Adolesc Med.* 1998,152:147–149
12. Wintgens A, Boileau B, Robaey P. Posttraumatic stress symptoms and medical procedures in children. *Can J Psychiatry.* 1997,42:611–616
13. Kain ZN, Mayes LC, Wang SM, Hofstadter MB. Postoperative behavioral outcomes in children: effects of sedative premedication. *Anesthesiology.* 1999,90:758–765
14. Lipton J, Marbach J. Ethnicity and the pain experience. *Soc Sci Med.* 1984,19:1279–1298
15. Wolff BB. Ethnocultural factors influencing pain and illness behavior. *Clin J Pain.* 1985,1:23–30
16. Martinelli AM. Pain and ethnicity: how people of different cultures experience pain. *AORN J.* 1987,46:273–274, 276, 278
17. Bernstein BA, Pachter LM. Cultural considerations in children's pain. In: Schechter NL, Berde CB, Yaster M, eds. *Pain in Infants, Children, and Adolescents.* Philadelphia, PA: Lippincott, Williams, and Wilkins; 2003: 142–156
18. Todd KH, Deaton C, D'Adamo AP, Goe L. Ethnicity and analgesic practice. *Ann Emerg Med.* 2000,35:11–16
19. Todd KH, Samaroo N, Hoffman JR. Ethnicity as a risk factor for inadequate emergency department analgesia. *JAMA.* 1993,269: 1537–1539

20. Hoestetler MA, Auinger P, Szilagyi PG. Parenteral analgesic and sedative use among ED patients in the United States: combined results from the national hospital ambulatory medical care survey (NHAMCS) 1992–1997. *Am J Emerg Med.* 2002,20:139–143
21. Karpman RR, Del Mar N, Bay C. Analgesia for emergency centers' orthopaedic patients: does an ethnic bias exist? *Clin Orthop.* 1997,334:270–275
22. Fuentes EF, Kohn MA, Neighbor ML. Lack of association between patient ethnicity or race and fracture analgesia. *Acad Emerg Med.* 2002,9:910–915
23. McGrath PJ, Frager G. Psychological barriers to optimal pain management in infants and children. *Clin J Pain.* 1996,12:135–141
24. Craig KD, Lilley CM, Gilbert CA. Social barriers to optimal pain management in infants and children. *Clin J Pain.* 1996,12:232–242
25. Zempsky WT. Developing the painless emergency department: a systematic approach to change. *Clin Pediatr Emerg Med.* 2000,1:253–259
26. Ducharme J. Acute pain and pain control: state of the art. *Ann Emerg Med.* 2000,35:592–603
27. Kelly AM. A process approach to improving pain management in the emergency department: development and evaluation. *J Accid Emerg Med.* 2000,17:185–187
28. American Academy of Pediatrics, Committee on Psychosocial Aspects of Child and Family Health and American Pain Society, Task Force on Pain in Infants, Children, and Adolescents. The assessment and management of acute pain in infants, children, and adolescents. *Pediatrics.* 2001,108:793–797
29. Twycross A. Education about pain: a neglected area? *Nurse Educ Today.* 2000,20:244–253
30. Joint Commission on Accreditation of Healthcare Organizations. *Comprehensive Accreditation Manual for Hospitals*. Oakbrook Terrace, IL: Joint Commission on Accreditation of Healthcare Organizations; 2001
31. Ricard-Hibbon A, Chollet C, Saada S, Loridant B, Marty J. A quality control program for acute pain management in out-of-hospital critical care medicine. *Ann Emerg Med.* 1999,34:738–744
32. Dieckmann R, Brownstein D, Gausche-Hill M, eds. *Pediatric Education for Prehospital Professionals*. Sudbury, MA: Jones and Bartlett; 2000: 151–152
33. Accreditation Council for Graduate Medical Education. *Program Requirements for Residency Education in Emergency Medicine*. Chicago, IL: Accreditation Council for Graduate Medical Education; 2001
34. Accreditation Council for Graduate Medical Education. *Program Requirements for Residency Education in Pediatrics*. Chicago, IL: Accreditation Council for Graduate Medical Education; 2001
35. Bennedetti C, Dickerson ED, Nichols LL. Medical education: a barrier to pain therapy and palliative care. *J Pain Symptom Manage.* 2001,21:360–362
36. Weinstein SM, Laux LF, Thornby JI, et al. Medical students' attitudes toward pain and the use of opioid analgesics: implications for changing medical school curriculum. *South Med J.* 2000,93:472–478
37. Phillips DM. JCAHO pain management standards are unveiled. Joint Commission on Accreditation of Healthcare Organizations. *JAMA.* 2000,284:428–429
38. Baskett PJ. Acute pain management in the field. *Ann Emerg Med.* 1999,34:784–785
39. Ward ME, Radburn J, Morant S. Evaluation of intravenous tramadol for use in the prehospital situation by ambulance patients. *Prehospital Disaster Med.* 1997,12:158–162
40. Vergnion M, Degesves S, Garcet L, Magotteaux V. Tramadol, an alternative to morphine for treating posttraumatic pain in the prehospital situation. *Anesth Analg.* 2001,92:1543–1546
41. Bruns BM, Dieckmann R, Shagoury C, Dingerson A, Swartzell C. Safety of pre-hospital therapy with morphine sulfate. *Am J Emerg Med.* 1992,10:53–57
42. Devellis P, Thomas SH, Wedel SK, Stein JP, Vinci RJ. Prehospital fentanyl analgesia in air-transported pediatric trauma patients. *Pediatr Emerg Care.* 1998,14:321–323
43. National Association of Emergency Medical Services Physicians. Use of nitrous oxide: oxygen mixtures in prehospital emergency medical care. *Prehospital Disaster Med.* 1990,5:273–274
44. Baskett PJ. Nitrous oxide in pre-hospital care. *Acta Anaesthesiol Scand.* 1994,38:775–776
45. Burton JH, Auble TE, Fuchs SM. Effectiveness of 50% nitrous oxide/50% oxygen during laceration repair in children. *Acad Emerg Med.* 1998,5:112–117
46. Luhmann JD, Kennedy RM, Jaffe DM, McAllister JD. Continuous-flow delivery of nitrous oxide and oxygen: a safe and cost-effective technique for inhalation analgesia and sedation of pediatric patients. *Pediatr Emerg Care.* 1999,15:388–392
47. Luhmann JD, Kennedy RM, Porter FL, Miller JP, Jaffe DM. A randomized clinical trial of continuous-flow nitrous oxide and midazolam for sedation of young children during laceration repair. *Ann Emerg Med.* 2001,37:20–27
48. French GM, Painter EC, Coury DL. Blowing away shot pain: a technique for pain management during immunization. *Pediatrics.* 1994, 93:384–388
49. Fowler-Kerry S, Lander JR. Management of injection pain in children. *Pain.* 1987,30:169–175
50. Megel ME, Houser CW, Gleaves LS. Children's responses to immunizations: lullabies as distraction. *Issues Compr Pediatr Nurs.* 1998,21:129–145
51. Fratianne RB, Prensner JD, Huston MJ, Super DM, Yowler CJ, Standley JM. The effect of music-based imagery and musical alternate engagement on the burn debridement process. *J Burn Care Rehabil.* 2001,22:47–53
52. Favara-Scacco C, Smirne G, Schiliro G, DiCataldo A. Art therapy as support for children with leukemia during painful procedures. *Med Pediatr Oncol.* 2001,36:474–480
53. Kutner L. *No Fears No Tears: Children With Cancer Coping With Pain* [videotape]. Vancouver, BC, Canada: Canadian Cancer Society; 1986
54. Alcock DS, Feldman W, Goodman JT, McGrath PJ, Park JM. Evaluation of child life intervention in emergency department suturing. *Pediatr Emerg Care.* 1985,1:111–115
55. American Academy of Pediatrics, Committee on Hospital Care. Child life services. *Pediatrics.* 2000,106:1156–1159
56. Rothenberg MB. The unique role of the child life worker in children's health care settings. *Child Health Care.* 1982,10:121–124
57. Rae WA, Worchel FF, Upchurch J, Sanner JH, Daniel CA. The psychosocial impact of play on hospitalized children. *J Pediatr Psychol.* 1989,14:617–627
58. Bauchner H, Waring C, Vinci R. Parental presence during procedures in an emergency room: results from 50 observations. *Pediatrics.* 1991,87:544–588
59. Wolfram RW, Turner ED, Philput C. Effects of parental presence during young children's venipuncture. *Pediatr Emerg Care.* 1997,13: 325–328
60. Bordreaux ED, Francis JL, Loyacano 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
61. Emergency Nurses Association. Emergency Nurses Association position statements: family presence at the bedside during invasive procedures and resuscitation. 2001. Available at: www.ena.org/about/position/familypresence.asp. Accessed April 28, 2004
62. Wong DL, Hockenberry-Eaton M, Winkelstein ML, et al, eds. Pain assessment. In: *Whaley and Wong's Nursing Care of Infants and Children*. 6th ed. St Louis, MO: Mosby; 1999:1148–1159
63. Beyer JE, Aradine CR. Content validity of an instrument to measure young children's perceptions of the intensity of their pain. *J Pediatr Nurs.* 1986,1:386–395
64. Scott J, Huskisson EC. Graphic representation of pain. *Pain.* 1976,2: 175–184
65. McGrath PA, Johnson G, Goodman JT, et al. CHEOPS: a behavioral scale for rating postoperative pain in children. *Adv Pain Res Ther.* 1985,9:395–402
66. Grunau RV, Craig KD. Pain expression in neonates: facial action and cry. *Pain.* 1987,28:395–410
67. McGrath PJ. Behavioral measures of pain. In: Finley GA, McGrath PJ, eds. *Measurement of Pain in Infants and Children*. Seattle, WA: IASP Press; 1998:83–102
68. Fry M, Holdgate A. Nurse-initiated intravenous morphine in the emergency department: efficacy, rate of adverse events and impact on time to analgesia. *Emerg Med (Fremantle).* 2002,14:249–254
69. Michalewski TG, Zempsky WT, Schechter NL. Pain in low-severity emergency department visits: frequency and management [abstract]. *Ann Emerg Med.* 2001,38:S21
70. Fein JA, Callahan JM, Boardman CR. Intravenous catheterization in the ED: is there a role for topical anesthesia? *Am J Emerg Med.* 1999,17:624–625
71. Fein JA, Callahan JM, Boardman CR, Gorelick MH. Predicting the need for topical anesthetic in the pediatric emergency department. *Pediatrics.* 1999,104(2). Available at: www.pediatrics.org/cgi/content/full/104/2/e19
72. Kleiber C, Sorenson M, Whiteside K, Gronstal BA, Tannous R. Topical anesthetics for intravenous insertion in children: a randomized equivalency study. *Pediatrics.* 2002,110:758–761

73. Eichenfield LF, Funk A, Fallon-Friedlander S, Cunnigham BB. A clinical study to evaluate the efficacy of ELA-Max (4% liposomal lidocaine) as compared with eutectic mixture of local anesthetics cream for pain reduction of venipuncture in children. *Pediatrics.* 2002,109: 1093–1099
74. Zempsky WT, Anand KJ, Sullivan KM, Fraser D, Cucina K. Lidocaine iontophoresis for topical anesthesia before intravenous line placement in children. *J Pediatr.* 1998,132:1061–1063
75. Squire SJ, Kirchhoff KT, Hissong K. Comparing two methods of topical anesthesia used before intravenous cannulation in pediatric patients. *J Pediatr Health Care.* 2000,14:68–72
76. Cohen Reis E, Holobukov R. Vapocoolant spray is equally effective as EMLA cream in reducing immunization pain in school-aged children. *Pediatrics.* 1997,100(6). Available at: www.pediatrics.org/cgi/content/full/100/6/e5
77. Ramsook CA, Kozinetz C, Moro-Sutherland D. The efficacy of ethyl chloride as a local anesthetic for venipuncture in an emergency room setting. Paper presented at: 39th Annual Meeting of the Ambulatory Pediatric Association; May 3, 1999; San Francisco, CA
78. Schilling CG, Bank DE, Borchert BA, Klatzko MD, Uden DL. Tetracaine, epinephrine and cocaine (TAC) versus lidocaine, epinephrine, and tetracaine (LET) for anesthesia of lacerations in children. *Ann Emerg Med.* 1995,25:203–208
79. Ernst AA, Marvez E, Nick TG, Chin E, Wood E, Gonzaba WT. Lidocaine adrenaline tetracaine gel versus tetracaine adrenaline cocaine gel for topical anesthesia in linear scalp and facial lacerations in children aged 5 to 17 years. *Pediatrics.* 1995,95:255–258
80. Zempsky WT, Karasic RB. EMLA versus TAC for topical anesthesia of extremity wounds in children. *Ann Emerg Med.* 1997,30:163–166
81. Singer AJ, Stark MJ. LET versus EMLA for pretreating lacerations: a randomized trial. *Acad Emerg Med.* 2001,8:223–230
82. Simon HK, McLario DJ, Bruns TJ, Zempsky WT, Wood RJ, Sullivan KM. Long-term appearance of lacerations repaired using a tissue adhesive. *Pediatrics.* 1997,99:193–195
83. Quinn J, Wells G, Sutcliffe T, et al. A randomized trial comparing octylcyanoacrylate tissue adhesive and sutures in the management of lacerations. *JAMA.* 1997,277:1527–1530
84. Zempsky WT, Parrotti D, Grem C, Nichols J. Randomized controlled comparison of cosmetic outcomes of simple facial lacerations closed with SteriStrip Skin Closures or Dermabond tissue adhesive. *Pediatr Emerg Care.* 2004;20:519–524
85. Holger JS, Wandersee SC, Hale DB. Cosmetic outcomes in facial lacerations closed with rapid absorbing gut, octylcyanoacrylate or nylon [abstract]. *Acad Emerg Med.* 2002,9:447–448
86. Karounis H, Gouin S, Eisman H, Chalut D, Pelletier H, Williams B. A randomized, controlled trial comparing long-term cosmetic outcomes of traumatic pediatric lacerations repaired with absorbable plain gut versus nonabsorbable nylon sutures. *Acad Emerg Med.* 2004;11:730–735
87. Klein EJ, Shugerman RP, Leigh-Taylor K, Schneider C, Portscheller D, Koepsell T. Buffered lidocaine: analgesia for intravenous line placement in children. *Pediatrics.* 1995,95:709–712
88. Bartfield JM, Gennis P, Barbera J, Breuer B, Gallagher EJ. Buffered versus plain lidocaine as a local anesthetic for simple laceration repair. *Ann Emerg Med.* 1990,19:1387–1390
89. Davidson JA, Boom SJ. Warming lignocaine to reduce pain associated with injection. *BMJ.* 1992,305:617–618
90. Krause RS, Moscati R, Filice M, Lerner EB, Hughes D. The effect of injection speed on the pain of lidocaine infiltration. *Acad Emerg Med.* 1997,4:1032–1035
91. Scarfone RJ, Jasani M, Gracely EJ. Pain of local anesthetics: rate of administration and buffering. *Ann Emerg Med.* 1998,31:36–40
92. Bartfield JM, Sokaris SJ, Raccio-Robak N. Local anesthesia for lacerations: pain of infiltration inside versus outside the wound. *Acad Emerg Med.* 1998,5:100–104
93. Bartfield JM, Homer PJ, Ford DT, Sternklar P. Buffered lidocaine as a local anesthetic: an investigation of shelf life. *Ann Emerg Med.* 1992,21:16–19
94. Meyer G, Henneman PL, Fu P. Buffered lidocaine [letter]. *Ann Emerg Med.* 1991,20:218–219
95. Taddio A, Ohlsson A, Einarson TR, Stevens B, Koren G. A systematic review of lidocaine-prilocaine cream (EMLA) in the treatment of acute pain in neonates. *Pediatrics.* 1998,101(2). Available at: www.pediatrics.org/cgi/content/full/101/2/e1
96. Essink-Tebbes CM, Wuis EW, Liem KD, van Dongen RT, Hekster YA. Safety of lidocaine-prilocaine cream application four times a day in premature neonates: a pilot study. *Eur J Pediatr.* 1999,158:421–423
97. Brisman M, Ljung BM, Otterbom I, Larsson LE, Andreasson SE. Methaemoglobin formation after the use of EMLA cream in term neonates. *Acta Paediatr.* 1998,87:1191–1194
98. Blass E, Fitzgerald E, Kehoe P. Interactions between sucrose, pain and isolation distress. *Pharmacol Biochem Behav.* 1987,26:483–489
99. Barr RG, Young SN, Wright JH, et al. "Sucrose analgesia" and diphtheria-tetanus-pertussis immunizations at 2 and 4 months. *J Dev Behav Pediatr.* 1995,16:220–225
100. Lewindon PJ, Harkness L, Lewindon N. Randomised controlled trial of sucrose by mouth for the relief of infant crying after immunisation. *Arch Dis Child.* 1998,78:453–456
101. Stevens B, Taddio A, Ohlsson A, Einarson T. The efficacy of sucrose for relieving procedural pain in neonates—a systematic review and meta-analysis. *Acta Paediatr.* 1997,86:837–842
102. Carbajal R, Chauvet X, Couderc S, Olivier-Martin M. Randomised trial of analgesic effects of sucrose, glucose, and pacifiers in term neonates. *BMJ.* 1999,319:1393–1397
103. Gray L, Watt L, Blass EM. Skin-to-skin contact is analgesic in healthy newborns. *Pediatrics.* 2000,105(1). Available at: www.pediatrics.org/cgi/content/full/105/1/e14
104. Gray L, Miller LW, Philipp BL, Blass EM. Breastfeeding is analgesic in healthy newborns. *Pediatrics.* 2002,109:590–593
105. Pinheiro JM, Furdon S, Ochoa LF. Role of local anesthesia during lumbar puncture in neonates. *Pediatrics.* 1993,91:379–382
106. Kaur G, Gupta P, Kumar A. A randomized trial of eutectic mixture of local anesthetics during lumbar puncture in newborns. *Arch Pediatr Adolesc Med.* 2003,157:1065–1070
107. Carraccio C, Feinberg P, Hart LS, Quinn M, King J, Lichenstein R. Lidocaine for lumbar punctures. A help not a hindrance. *Arch Pediatr Adolesc Med.* 1996,150:1044–1046
108. Larsson BA, Tannfeldt G, Lagercrantz H, Olsson GL. Venipuncture is more effective and less painful than heel lancing for blood tests in neonates. *Pediatrics.* 1998,101:882–886
109. Uhari M. A eutectic mixture of lidocaine and prilocaine for alleviating vaccination pain in infants. *Pediatrics.* 1993,92:719–722
110. Holmes HS. Options for painless local anesthesia. *Postgrad Med.* 1991,89:71–72
111. Keen MF. Comparison of intramuscular injection techniques to reduce site discomfort and lesions. *Nursing Res.* 1986,35:207–210
112. Main KM, Jorgensen JT, Hertel NT, Jensen S, Jakobsen L. Automatic needle insertion diminishes pain during growth hormone injection. *Acta Pediatr.* 1995,84:331–334
113. Ipp MM, Gold R, Goldbach M, et al. Adverse reactions to diphtheria, tetanus, pertussis-polio vaccination at 18 months of age: effect of injection site and needle length. *Pediatrics.* 1989,83:679–682
114. Schichor A, Bernstein B, Weinerman H, Fitzgerald J, Yordan E, Schechter N. Lidocaine as a diluent for ceftriaxone in the treatment of gonorrhea: does it reduce the pain of injection? *Arch Pediatr Adolesc Med.* 1994,148:72–75
115. LoVecchio F, Oster N, Sturmann K, Nelson LS, Flashner S, Finger R. The use of analgesics in patients with acute abdominal pain. *J Emerg Med.* 1997,15:775–779
116. Pace S, Burke TF. Intravenous morphine for early pain relief in patients with acute abdominal pain. *Acad Emerg Med.* 1996,3:1086–1092
117. Attard AR, Corlett MJ, Kidner NJ, et al. Safety of early pain relief for acute abdominal pain. *BMJ.* 1992,305:554–556
118. Kim MK, Strait RT, Sato TT, Hennes HM. A randomized clinical trial of analgesia in children with acute abdominal pain. *Acad Emerg Med.* 2002,9:281–287
119. Hedderich R, Ness TJ. Analgesia for trauma and burns. *Crit Care Clin.* 1999,15:167–184
120. Joseph MH, Brill J, Zeltzer LK. Pediatric pain relief in trauma. *Pediatr Rev.* 1999,20:75–83
121. Zohar Z, Eitan A, Halperin P, et al. Pain relief in major trauma patients: an Israeli perspective. *J Trauma.* 2001,51:767–772
122. Fletcher AK, Rigby AS, Heyes FL. Three-in-one femoral nerve block as analgesia for fractured neck of femur in the emergency department: a randomized, controlled trial. *Ann Emerg Med.* 2003,41:227–233
123. Blasier RD, White R. Intravenous regional anesthesia for management of children's extremity fractures in the emergency department. *Pediatr Emerg Care.* 1996,12:404–406
124. Krauss B. Managing acute pain and anxiety in children undergoing procedures in the emergency department. *Emerg Med (Fremantle).* 2001,13:293–304
125. Kennedy RM, Luhmann JD. The "ouchless emergency department." Getting closer: advances in decreasing distress during painful procedures in the emergency department [review]. *Pediatr Clin North Am.* 1999,46:1215–1247, vii–viii

126. Yaster M, Nichols DG, Deshpande JK, Wetzel RC. Midazolam-fentanyl intravenous sedation in children: case report of respiratory arrest. *Pediatrics.* 1990,86:463–466
127. American Academy of Pediatrics, Committee on Drugs. Guidelines for monitoring and management of pediatric patients during and after sedation for diagnostic and therapeutic procedures. *Pediatrics.* 1992,89:1110–1115
128. American Academy of Pediatrics, Committee on Drugs. Guidelines for monitoring and management of pediatric patients during and after sedation for diagnostic and therapeutic procedures: addendum. *Pediatrics.* 2002,110:836–838
129. American Society of Anesthesiologists, Task Force on Sedation and Analgesia by Non-Anesthesiologists. Practice guidelines for sedation and analgesia by non-anesthesiologists. *Anesthesiology.* 2002,96: 1004–1017
130. American College of Emergency Physicians. Clinical policy for procedural sedation and analgesia in the emergency department. *Ann Emerg Med.* 1998,31:663–677
131. Hoffman GM, Nowakowski R, Troshynski TJ, Berens RJ, Weisman SJ. Risk reduction in pediatric procedural sedation by application of an American Academy of Pediatrics/American Society of Anesthesiologists process model. *Pediatrics.* 2002,109:236–243
132. Cote CJ, Notterman DA, Karl HW, Weinberg JA, McCloskey C. Adverse sedation events in pediatrics: a critical incident analysis of contributing factors. *Pediatrics.* 2000,105:805–814
133. McDevit DC, Perry H, Tucker J, Zempsky W. Sedation in the pediatric emergency department: a survey of emergency department directors' adherence to sedation guidelines [abstract]. *Ann Emerg Med.* 2000,36:S28. Abstract 106
134. Roback MG, Wathen J, Bajaj L. Effect of NPO time on adverse events in pediatric procedural sedation and analgesia [abstract]. *Pediatr Res.* 2003,53:109A. Abstract 620
135. Phrampus ED, Pitetti RD, Singh S. Duration of fasting and occurrence of adverse events during procedural sedation in a pediatric emergency department [abstract]. *Pediatr Res.* 2003,53:109A. Abstract 621
136. Agrawal D, Manzi SF, Gupta R, Krauss B. Preprocedural fasting state and adverse events in children undergoing procedural sedation and analgesia in a pediatric emergency department. *Ann Emerg Med.* 2003,42:636–646
137. Pena BM, Krauss B. Adverse events of procedural sedation and analgesia in a pediatric emergency department. *Ann Emerg Med.* 1999,34:483–491
138. Green SM, Kupperman N, Rothrock SG, Hummel CB, Ho M. Predictors of adverse events with intramuscular ketamine sedation in children. *Ann Emerg Med.* 2000,35:35–42
139. Green SM, Krauss B. Pulmonary aspiration risk during emergency department procedural sedation—an examination of the role of fasting and sedation depth. *Acad Emerg Med.* 2002,9:35–42
140. American Society of Anesthesiologists, Task Force on Preoperative Fasting. Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures. *Anesthesiology.* 1999,90:896–905
141. Miaskowski C. Monitoring and improving pain management practices. A quality improvement approach. *Crit Care Nurs Clin North Am.* 2001,13:311–317
142. Gordon DB, Pellino TA, Miaskowski C, et al. A 10-year review of quality improvement monitoring in pain management: recommendations for standardized outcome measures. *Pain Manag Nurs.* 2002,3:116–130
143. American Pain Society, Quality of Care Committee. Quality improvement guidelines for the treatment of acute pain and cancer pain. *JAMA.* 1995,274:1874–1880

All clinical reports from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.