POLICY STATEMENT

Referral to Pediatric Surgical Specialists

abstract

The American Academy of Pediatrics, with the collaboration of the Surgical Sections of the American Academy of Pediatrics, has created referral recommendations intended to serve as voluntary practice parameters to assist general pediatricians in determining when and to whom to refer their patients for pediatric surgical specialty care. It is recognized that these recommendations may be difficult to implement, because communities vary in terms of access to major pediatric medical centers. Limited access does not negate the value of the recommendations, however, because the child who needs specialized surgical and anesthetic care is best served by the skills of the appropriate pediatric surgical team. Major congenital anomalies, malignancies, major trauma, and chronic illnesses (including those associated with preterm birth) in infants and children should be managed by pediatric medical subspecialists and pediatric surgical specialists at pediatric referral centers that can provide expertise in many areas, including the pediatric medical subspecialties and surgical specialties of pediatric radiology, pediatric anesthesiology, pediatric pathology, and pediatric intensive care. The optimal management of the child with complex problems, chronic illness, or disabilities requires coordination, communication, and cooperation of the pediatric surgical specialist with the child’s primary care pediatrician or physician. *Pediatrics* 2014;133:350–356

When a surgical condition has been identified in a child, ideally a pediatric surgical specialist should be called to address the issues related to this condition with the family and the respective pediatrician. It is recognized that communities differ in their medical resources. Specialists of all varieties tend to concentrate in areas of higher population density. In communities where it would be a hardship to the family and the child to travel long distances, the family, in conjunction with the primary care pediatrician/physician, should weigh the advantages of traveling to a center with a pediatric surgical specialist for surgical care. The primary care pediatrician or physician should consider calling the pediatric surgical specialist to discuss whether a consultation is advised in cases in which, geographically, the specialist is not near.

Finally, however, it should be noted that these recommendations are voluntary for practice management. Each pediatrician must make an independent judgment in each case on the basis of facts and circumstances presented to him or her. Whereas in some areas evidence
is available for better outcomes with specialist assessment and treatment, these recommendations are, in large part, derived from expert opinion of children’s surgical specialists.

REFERRAL TO A CONGENITAL HEART SURGEON

Care of neonates, infants, children, and teenagers with congenital heart disease should occur at specialized centers that include the following: congenital heart surgeons, pediatric cardiologists subspecializing in invasive and noninvasive cardiology, pediatric cardiac anesthesiologists, and pediatric cardiac critical care specialists. Congenital heart surgeons operate on the heart and great vessels of neonates, infants, children, teenagers, and adults with congenital heart disease. A congenital heart surgeon has completed training in general surgery and thoracic surgery, is certified by the American Board of Thoracic Surgery, and has further specialized in the surgical treatment of congenital heart disease. The American Board of Thoracic Surgery now offers a subspecialty certificate in congenital heart surgery that can be earned by those Diplomates of the American Board of Thoracic Surgery who have specialized in pediatric cardiology by completing approved training programs. This certificate recognizes training and experience in the provision of cardiac care in children. Postgraduate training for a pediatric cardiologist includes training in infant and early child cardiac disease risk assessment; anticipatory guidance; hospital cardiology; oral sedation; general anesthesia; infant oral health care; behavior guidance; specialized care for the primary, mixed, and adult dentitions; pediatric oral pathology; prevention; and interventional orthodontics. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years). All children should have a Dental Home within 6 months of the eruption of the first tooth.

A pediatric patient who presents with any of the following conditions should be referred for prompt consultation to a pediatric dentist or a general dentist who maintains a high level of competence in the care of children:

- an infant determined to have high caries risk through a caries risk assessment;
- an infant/child/adolescent with a severe developmental disability that makes management of behavior and clinical care challenging;
- an infant/child/adolescent with rampant or extensive dental caries requiring oral sedation or general anesthesia for treatment;
- an infant/child/adolescent preparing to undergo radiation therapy, chemotherapy, and/or hematopoietic stem cell transplantation;
- an infant/child/adolescent who is medically compromised and whose medical condition would deteriorate without appropriate dental treatment;
- an infant/child/adolescent with a facial swelling of unknown origin;
- a child with oral habits (ie, thumb sucking, pacifier, tongue thrust) that may require intervention to prevent or improve a dental malocclusion;
- an infant/child/adolescent with a possible oral abnormality;
- a child/adolescent for the management of prematurely loose teeth and/or periodontal disease;
- an infant/child/adolescent with a cleft lip/palate or other craniofacial anomaly;
- a child/adolescent who is intending to participate in contact athletic activities that require fabrication of an athletic mouth guard;
- an infant/child/adolescent with suspected dental neglect or abuse;
- an infant/child/adolescent who suffers dental trauma (ie, tooth fracture, intrusion, luxation, and avulsion); or

REFERRAL TO A PEDIATRIC DENTIST

A pediatric dentist has completed 4 years of dental school and a 2- to 3-year postgraduate residency in pediatric dentistry. The American Board of Pediatric Dentistry offers a subspecialty certificate in pediatric dentistry that can be earned by those Diplomates of the American Board of Dentistry who have specialized in pediatric dentistry by completing approved training programs. This certificate recognizes training and experience in the provision of oral health care in children. Postgraduate training for a pediatric dentist includes training in infant and early child oral disease risk assessment; anticipatory guidance; hospital dentistry; oral sedation; general anesthesia; infant oral health care; behavior guidance; specialized care for the primary, mixed, and adult dentitions; pediatric oral pathology; prevention; and interventional orthodontics. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years). All children should have a Dental Home within 6 months of the eruption of the first tooth.

A pediatric patient who presents with any of the following conditions should be referred for prompt consultation to a pediatric dentist or a general dentist who maintains a high level of competence in the care of children:

- all neonates, infants, children, and teenagers with acquired heart disease requiring cardiac surgery (eg, endocarditis, cardiac tumors, Kawasaki disease); and
- all neonates, infants, children, and teenagers with end-stage heart disease requiring transplantation or mechanical support, whether attributable to congenital heart disease or myopathies.
• an infant, child and/or adolescent whose caregiver requests the care of a pediatric dental specialist. Referral of a patient to a pediatric dentist may result in referrals to other dental specialists (orthodontist, oral surgeon, endodontist, periodontist, etc) for appropriate care, with the pediatric dentist managing the care and referral of the patient.

REFERRAL TO A PEDIATRIC NEUROLOGIC SURGEON

A pediatric neurosurgeon is identified by board certification. The American Board of Pediatric Neurologic Surgery offers a subspecialty certificate in pediatric neurologic surgery that can be earned by those Diplomates of the American Board of Neurologic Surgery who have specialized in pediatric neurologic surgery by completing approved training programs. This certificate recognizes training and experience in the care of children with neurologic surgical problems, as well as the care of congenital disorders throughout the life span, as demonstrated by a minimum of a 75% pediatric neurosurgical operative caseload. It is recognized that in an era of increasing neurosurgical subspecialization, children with particular disorders (eg, intracranial aneurysms) may be better served by a specialist experienced with that specific disorder. The pediatric neurosurgeon is usually in the best position to determine the most appropriate balance of care for both the child and condition by virtue of access to other regional pediatric and neurosurgical specialists. With these comments in mind, the following recommendations are suggested for referral of the infant (0–1 year), child (2–12 years), and adolescent (13–18 years) to a pediatric neurosurgical specialist.

• All infants and children requiring neurosurgical operative care should be cared for by a pediatric neurosurgeon if one is within reasonable proximity. However, it is recognized that under some circumstances, the distance to the nearest pediatric neurosurgeon is prohibitive, and it may be necessary for a general neurosurgeon to provide care; the benefits of each option should be considered on an individual basis.

• Infants and children with traumatic head, spine, spinal cord, and peripheral nerve injuries may be stabilized at a local hospital but should then be transferred to a center having both pediatric neurosurgical expertise and a system in place to care for the traumatically injured child. Infants and children with suspected abusive head trauma should also be evaluated by a pediatric neurosurgeon as part of a team of dedicated pediatric child abuse specialists.

• Infants, children, and adolescents with benign and malignant central nervous system tumors (including tumors involving the brain, spinal cord, meninges, spine, pituitary gland, and peripheral nerves) should be referred from the outset to a pediatric neurosurgeon and other dedicated pediatric cancer specialists.

• Infants, children, and adolescents with congenital brain and spinal cord malformations (including spina bifida) should be cared for by a pediatric neurosurgeon as part of a multidisciplinary medical-surgical team (such as a spina bifida clinic).

• All infants, children, and adolescents with disorders of the craniofacial skeleton (eg, craniosynostosis and craniofacial disorders) should be cared for by a pediatric neurosurgeon as part of a craniofacial team.

• Infants with hydrocephalus, as well as children and adolescents with complex hydrocephalus, are preferably cared for by a pediatric neurosurgeon; those for whom neuroendoscopy is a surgical option should be evaluated by a pediatric neurosurgeon with neuroendoscopy experience.

• Infants, children, and adolescents with intractable epilepsy who are being considered for seizure surgery should be referred to a neurosurgeon having expertise in seizure surgery.

• Infants and children with infections of the central nervous system, including epidural abscess, subdural empyema, or brain abscess, are preferably cared for by a pediatric neurosurgeon in conjunction with specialists in pediatric infectious disease.

• Infants and children with medical conditions that increase operative risk, such as congenital heart disease, who must undergo a neurosurgical procedure should be cared for by a pediatric neurosurgeon with access to other pediatric specialists.

REFERRAL TO A PEDIATRIC OPHTHALMOLOGY SPECIALIST

A pediatric ophthalmologist has completed a residency in ophthalmology, is certified by the American Board of Ophthalmologic Surgery, and has completed additional training of at least 1 year in pediatric ophthalmology. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years).
Pediatric patients with the following conditions should be referred to a pediatric ophthalmologist:

- children 7 years or younger who are nonverbal or unable to read letters and in whom there is reason to suspect eye disease;
- infants or children with retinoblastoma or other tumors of the eye and orbital area;
- infants or children with known or suspected cataracts, glaucoma, or blindness;
- infants or children with a diagnosis or at risk of retinopathy of prematurity;
- infants or children with congenital or genetic ocular anomalies or infections (eg, aniridia, toxoplasmosis);
- infants or children with systemic syndromes, metabolic disorders, or chromosomal abnormalities with possible ocular involvement (eg, juvenile idiopathic arthritis, galactosemia, diabetes mellitus, Marfan syndrome, Down syndrome); and
- infants or children suspected of being abused and in whom there is a possibility of eye injury.

Pediatric patients with the following conditions are preferably managed by a pediatric ophthalmologist:

- infants with congenital nystagmus and children with early-onset nystagmus;
- children with strabismus or amblyopia (ie, dimness of vision without detectable organic lesion of the eye) or risk factors for strabismus or amblyopia (eg, family history of amblyopia or orbital or eyelid hemangioma);
- children with a family history of congenital or genetic ocular anomalies (eg, aniridia), infections (eg, toxoplasmosis), tumors (eg, retinoblastoma), or a family history of systemic or metabolic syndromes (eg, juvenile idiopathic arthritis, galactosemia, diabetes mellitus), chromosomal abnormalities (eg, Down syndrome), or other disorders with possible ocular involvement;
- infants or children with exposure during gestation to certain specific drugs or other substances (such as alcohol) that are known to cause anomalies of the eyes;
- infants or children with poor vision or delayed attainment of vision-related developmental milestones and infants and children with severe refractive errors or a strong family history of severe refractive errors; and
- infants or children with ocular or periocular inflammation not responding to initial topical and/or systemic antibiotic therapy or not clearing within 3 weeks of treatment and children with suspected herpes simplex or zoster infections involving the eye or a history of these infections involving the eye.

The following patients may be best cared for by a pediatric orthopedic surgeon:

- infants with malformations of the limbs (eg, idiopathic clubfoot, congenital limb deficiency);
- children and adolescents with significant limb deformity secondary to metabolic bone disease or other types of growth arrest or with significant limb length discrepancy;
- infants, children, and adolescents with developmental dysplasia of the hip (screening for developmental dysplasia of the hip is performed by the primary care pediatrician);
- infants, children, and adolescents with bone or joint infection (eg, osteomyelitis, septic arthritis), in conjunction with the primary care pediatrician and pediatric infectious disease specialist;
- children with Perthes disease (ie, osteochondritis of the femoral head);
- children and adolescents with slipped capital femoral epiphysis;
- infants, children, and adolescents with significant spinal deformity (scoliosis or kyphosis);
- infants, children, and adolescents with disability, deformity, or gait abnormality secondary to neuromuscular conditions (eg, cerebral palsy, spina bifida, muscular dystrophy, spinal muscular atrophy);
- children and adolescents with sports injuries, such as anterior cruciate ligament tears, meniscal tears, cartilage injuries, ankle instability, or shoulder instability;
- adolescents with deformities or sequelae from childhood musculoskeletal disorders;
- infants, children, and adolescents with multiple skeletal trauma or complex fractures and dislocations; and

**REFERRAL TO A PEDIATRIC ORTHOPEDIC SURGERY SPECIALIST**

A pediatric orthopedic surgeon has completed a residency in orthopedics and completed an additional Accreditation Council for Graduate Medical Education-approved 1-year fellowship in pediatric orthopedics. An orthopedic tumor surgeon has completed a residency in orthopedics, plus additional training in orthopedic oncology, and devotes his or her practice to patients with cancer of the bones and joints. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years).
● children with musculoskeletal extremity or spine injuries who may be victims of nonaccidental trauma.

Malignant bone tumors should be managed by an orthopedic tumor surgeon, in conjunction with a pediatric medical cancer specialist. Benign bone tumors should be managed by a pediatric orthopedic surgeon or an orthopedic tumor surgeon. Congenital deformities or neuromuscular abnormalities of the upper extremity (including obstetrical brachial plexus injuries) should be managed by a pediatric orthopedic surgeon or a pediatric upper extremity surgeon.

**REFERRAL TO A PEDIATRIC OTOLARYNGOLOGY SPECIALIST**

A pediatric otolaryngologist has completed a 4- to 5-year residency in otolaryngology/head and neck surgery and is certified by the American Board of Otolaryngologic Surgery. In addition, he or she has completed 1 or 2 years of fellowship training in pediatric otolaryngology. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years). The following patients should be referred to a pediatric otolaryngologist, although a pediatric plastic surgeon, pediatric surgeon, pediatric dentist, or pediatric oromaxillofacial surgeon with appropriate education, training, and experience would also be appropriate in some cases:

- infants, children, and adolescents with congenital malformations of head and neck structures, including the ear, nasal passages, oral cavity, and laryngotracheal airway;
- infants and children with sensory impairments, including conductive or sensorineural hearing loss, vertiginous disorders, unilateral and bilateral true vocal fold paralysis, facial nerve paralysis, and oromotor dysfunction as evidenced by speech, swallowing, or drooling problems;
- infants and children with acquired otolaryngologic disorders involving the ear (eg, cholesteatoma), the pharynx, the laryngotracheal airway (eg, postintubation laryngotracheal stenosis), the aerodigestive tract (eg, foreign body aspirations), and the facial skeleton (eg, maxillofacial trauma);
- infants, children, and adolescents with neoplasms or vascular malformations of the head and neck structures, including the laryngotracheal airway;
- infants and children with medical conditions that increase operative risk (eg, congenital heart disease) who must undergo a common otolaryngologic procedure (eg, adenotonsillectomy) and infants and children requiring operative airway endoscopy for the evaluation of stridor.

The following patients are preferably managed by a pediatric otolaryngologist:

- infants and children with complicated infections that may require surgery involving the ear (eg, otitis media with effusion and hearing change), the nose and paranasal sinuses (eg, chronic rhinosinusitis), the pharynx (eg, recurrent adenotonsillitis), the airway (eg, epiglottitis), and the neck (eg, retropharyngeal abscesses).

**REFERRAL TO A PEDIATRIC PLASTIC SURGERY SPECIALIST**

A pediatric plastic surgeon is certified by the American Board of Plastic Surgery. He or she has completed the requirements of residency training for board certification in plastic surgery (usually a total of 6 or more years of surgical and surgical specialty training) plus an additional year training in pediatric plastic surgery and/or pediatric craniofacial surgery, although it is recognized that some general plastic surgeons and occasionally pediatric surgical specialists have the requisite education, training, and experience to deal with some of these problems. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years). Infants, children, and adolescents with congenital malformations of head and neck structures, including the skull (ie, deformational plagiocephaly or craniosynostosis, among others), eyes (ie, microphthalmia, eyelid ptosis), ears (ie, prominent ear deformity, microtia), nose (ie, dermoid lesions, arhinia), mouth (ie, clefts of the lip and palate), and jaws (ie, malocclusion, hemifacial microsomia), should be referred to a pediatric plastic surgeon.

- Infants and children with congenital malformations of the limbs (eg, syndactyly, polydactyly) should be referred to a pediatric plastic surgeon.
- Infants, children, and adolescents with major or significant burns or injuries should be stabilized at a local hospital and then transferred to a pediatric burn/trauma center with a pediatric plastic surgeon as part of the treatment team.
- Infants, children, and adolescents with trauma to the hand, specifically including bone, tendon, and skin injuries, should be referred to a pediatric plastic surgeon.
- Infants, children, and adolescents with large cutaneous pigmented or vascular lesions (eg, nevi, port wine stains, arteriovenous malformations) should be referred to
a pediatric plastic surgeon or other pediatric surgical specialist with the appropriate education, training, and experience.

- Infants, children, and adolescents with large bone or soft tissue tumors that, when excised, leave defects requiring tissue transfer or reconstruction are preferably cared for by a pediatric plastic surgeon.

The pediatric plastic surgeon is optimally part of a multispecialty team (with pediatricians and other pediatric surgical specialists) in management of conditions such as myelomeningocele or complex problems requiring tissue expansion or microsurgical procedures.

**REFERRAL TO A PEDIATRIC SURGEON**

A pediatric surgeon has completed a 5-year residency training in general surgery, plus a 2-year fellowship in pediatric surgery. He or she is certified by the American Board of Surgery and has further specialized in the surgical treatment of children. The American Board of Surgery now offers a subspecialty certificate in pediatric surgery that can be earned by those Diplomates of the American Board of Surgery who have specialized in pediatric surgery. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years).

- Patients 5 years or younger who may need surgical care should be cared for by a pediatric surgeon.
- Seriously injured infants and children may be stabilized at a local hospital and then should be transferred to a pediatric trauma center.
- Infants, children, and adolescents with solid malignancies should be cared for from the outset by a pediatric surgeon or pediatric surgical specialist and a pediatric medical cancer specialist.
- Minimally invasive procedures (eg, laparoscopy, thoracoscopy) in infants and children should be performed by a pediatric surgeon trained in these techniques.
- Infants and children with medical conditions that increase operative risk (eg, congenital heart disease, preterm birth) who must undergo a common surgical procedure (eg, hernia repair) should be cared for by a pediatric surgeon.

In the interest of good patient care, it is suggested that a general surgeon who cares for pediatric surgical problems not listed in the above categories should have had a minimum 6-month rotation as a junior or senior resident during his or her general surgical residency on a pediatric surgical service run by a pediatric surgeon. Emphasis in the training rotation should be on surgery in children older than 5 years.

A general surgeon performing surgery in children not listed in the above categories should care for a sufficient number of children annually to maintain a high level of competence and should annually attend pediatric surgery postgraduate courses and meetings.

**REFERRAL TO A PEDIATRIC UROLOGIST**

A pediatric urologist has completed training in urology, is certified by the American Board of Urology, and has completed a 2-year pediatric urology fellowship. The American Board of Urology now offers a subspecialty certificate in pediatric urology that can be earned by those Diplomates of the American Board of Urology who have specialized in pediatric urology. This certificate recognizes training and experience in the care of individuals with pediatric urologic conditions of all ages. The development of formal training programs and the availability of subspecialty boards in pediatric urology are relatively recent. Some urologists may have gained a lifetime of pediatric experience, but started practice before such fellowships were available. For purposes of developing these recommendations, the following group definitions are used: infant (0–1 year), child (2–12 years), and adolescent (13–18 years).

- Undescended testicles and elective congenital hydrocele/hernia are optimally corrected in infancy or early childhood; the operation should be performed by a pediatric urologist or surgical specialist.
- Hypospadias is usually repaired in infancy or early childhood; the operation should be performed by a pediatric urologist.
- Complex congenital urologic problems (eg, duplex systems, ureterocele, bladder or cloacal exstrophy, moderate or severe vesicoureteral reflux, posterior urethral valves, or other structural abnormalities of genitourinary development, such as persistent genitourinary sinus or cloacal abnormalities) should preferably be managed by a pediatric urologist.
- Solid malignancies of the kidney, bladder, and testicle should be treated from the outset by a pediatric urologist or surgical specialist in conjunction with a pediatric medical cancer specialist.
- Disorders of sex development should be managed from the outset by a pediatric urologist or surgical specialist in conjunction with a management team, which should include a pediatric endocrinologist and a psychologist.
in consultation with the primary care pediatrician.

- Cystoscopic procedures in infants and children preferably should be performed by a pediatric urologist.

- A pediatric urology consultation should be considered when a child has prolonged, severe daytime voiding difficulty.

- A pediatric urologist should be involved in the care of children with spinal cord disorders (eg, myelomeningocele, spinal cord injuries).

- Infants or children with major urologic injuries should be stabilized at the nearest medical center and then transported to a pediatric trauma center.

- Infants or children with testicular torsion should be evaluated at the nearest medical center and undergo surgery promptly.

- When a urinary tract abnormality has been identified prenatally, a pediatric urologist or surgeon should be consulted as a member of the fetal treatment team, preferably prenatally or as early postnatally as is feasible.

**REFERRAL FOR ENDOSCOPY**

Specialists in several pediatric surgical and pediatric medical fields are trained to perform endoscopic procedures in infants and children. For purposes of developing these recommendations, the following age group definitions are used: infant (0–1 year) and child (2–12 years).

- Endoscopy of the airways (eg, bronchoscopy, laryngoscopy) in infants and children should be performed by a pediatric surgeon or a pediatric otolaryngologist or an appropriately trained pediatric medical specialist, which may include a pediatric pulmonologist or a pediatric intensivist.

- Esophagoscopy in infants and children should be performed by a pediatric surgeon, a pediatric otolaryngologist, or a pediatric gastroenterologist.

- Endoscopy of the gastrointestinal tract distal to the esophagus (eg, esophagogastroduodenoscopy, colonoscopy) in infants and children should be performed by a pediatric surgeon or a pediatric gastroenterologist.

Because the care of infants, children, and adolescents changes and advances rapidly, these recommendations should be updated at regular intervals.

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