

# autism spectrum disorder and anesthesia

by Sean Antosh, MD



## background

**Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is manifested by qualitative impairment in social interactions, qualitative impairment in verbal and nonverbal communication, and restricted, repetitive and stereotypical patterns of behavior, interests and activities.<sup>1</sup> Symptoms must be present in the early developmental period and may be diagnosed as early as 18 months, but usually by the age of 2. The severity of autism spectrum disorder is based on social communication impairments and restricted, repetitive patterns of behavior.<sup>1</sup> The prevalence of ASD has increased over time to 1 in 88 due to better ascertainment and broadening of the diagnostic criteria.<sup>2</sup>**

**Children with ASD have an increased rate of hospital contact and are likely to require sedation and anesthesia for surgeries, procedures and imaging tests. ASD children are approximately two to three times more likely to experience an injury that needs medical attention.<sup>3</sup> These hospital encounters create a stressful environment for ASD patients due to their need for a routine and inability to adapt to a quickly changing environment.<sup>1</sup> Additionally, ASD patients are at an increased risk of adverse events occurring during hospitalizations.<sup>3</sup> These adverse events are more likely to occur if there is a failure to consider a child's routine, special interest, sensory sensitivities and level of understanding.<sup>3</sup> Preparation, understanding and knowledge by the patient, parents and care team help facilitate a smooth transition and ultimately a beneficial outcome.**

### preparation for anesthesia

Surgery is a stressful time for any patient, but especially those with ASD, due to the numerous new people they will meet, the new experiences of sights and sounds, and the inability to verbally communicate. This may be overwhelming and can lead to the

patient becoming upset, disruptive and uncooperative, leading to maladaptive, possibly harmful, behaviors.<sup>2</sup> Therefore, it is important to prepare patients and families early for the encounter.

A valuable preparation step is the development of individualized coping plans, which have been shown to be helpful in the perioperative

management of children with ASD.<sup>5</sup> The knowledge of ASD severity level can be helpful in determining the need for preoperative sedation.<sup>6</sup> During the preoperative phone call, it is important to identify the patient's cognitive level, methods of communication, interests, stressors/triggers for maladaptive behavior, sensory challenges, as well as previous medical encounters and how they do with transitions.<sup>2</sup> Sensory issues associated with ASD can be either hypersensitivity or hyposensitivity to a wide range of stimuli based on each sense, to include sights, sounds, smells, tastes, touch, balance and proprioception. From this information,

the perioperative multidisciplinary team can modify the experience to best accommodate the child's needs and avoid potential triggers and warning signs of overload.

Social stories can help facilitate a successful experience by decreasing surprises through visual desensitization.<sup>7</sup> These stories often include simple, reassuring descriptions and photos of different places the patient may visit while at the hospital, whom they might meet and what might happen. Dayton Children's certified child life specialists have developed a social story that they customize and share with families prior to the visit based on guardian request.

## learning objectives

Following the completion of this article, the reader should be able to:

1. Explain ASD patient preparation for anesthesia.
2. Cite common premedications and other non-pharmacologic strategies.
3. Recognize the optimal use and benefits of a sensory room.
4. Review perianesthesia management of ASD patients.



Image 1.

### arrival to hospital

Patients with ASD require more consideration in the perioperative process, to include priority scheduling and decreased wait times. Accommodations in the schedule should be made to allow patients with ASD to have the earliest possible procedure time to minimize the change to their usual routine. Children with ASD experience higher preoperative anxiety<sup>8</sup> and may need to take medications prior to arriving at the hospital. Parents are strongly recommended to give

home medications prior to arrival at the hospital to ease the transition to the perioperative setting.

Dayton Children's has developed dedicated "adaptive sensory friendly" rooms for patients with ASD or other sensory needs to wait in prior to procedure, to help reduce anxiety and improve compliance (image 1). The inspiration for these rooms came from research which showed that children with developmental disability were more relaxed during dental care in a sensory-adapted environment.<sup>9,10</sup> These

rooms are tailored specifically for the patient based on their individual coping plan developed by the certified child life specialists and the guardians. The sensory rooms allow for a quiet environment with low lighting and the ability to add color mood lighting through wall light tiles and a marbled LED wall. For those who are hyperactive, fidget objects may be added. If they have energy to expend, liquid color changing floor tiles may be added for them to walk on and explore. Additionally, bouncy chairs and floor cushions may be added to help protect them. For patients who are hypoactive, the room can be transformed into a quiet oasis. Stimulating lights are turned down, sounds are muffled with white noise machines or personal headphones, and/or weighted blankets may be present.

Since the inception of individualized coping plans and use of the adaptive sensory rooms in 2019, retrospective quality data analysis has shown a decrease in premedication use from 51% of patients to approximately 30% today. This aligns with previous research that showed 60% of ASD patients could be successfully managed without medication when an

individualized perioperative plan is utilized.<sup>5</sup> Dayton Children's perioperative team is currently enrolling patients in a prospective randomized controlled study regarding the use of adaptive sensory rooms, generously funded by the Dayton Children's Hospital Foundation's Robert C. Cohn Memorial Research Grant.

### arrival to operating room

While Dayton Children's is unique for the adaptive sensory rooms, other institutions may rely on premedication to aid in compliance. These patients' guardians are more likely to state their child needs a premedication as compared to parents of neurotypical children.<sup>8</sup> ASD patients are less likely to receive a standard premedication; however, they are significantly more likely to receive a nonstandard premedication – most commonly intramuscular ketamine.<sup>11</sup> There are several sedative-type medications (table 1) that may be given depending on the child and their behavioral needs. These may include midazolam, ketamine and/or dexmedetomidine, which may be given via oral or nasal route or intramuscular injection. Sometimes a combination of medications may be

necessary in rapidly escalating maladaptive behaviors for the safety of the patient and staff.

Depending on a facility's policies and procedures, a pediatric surgical patient will either undergo general anesthesia via an inhalation mask prior to intravenous line placement or have an intravenous line placed prior to entering the operating room.

Depending on many patient factors, including age, weight and comorbidities, the anesthesiologist decides when the intravenous line will be placed.

At pediatric-specific facilities, the intravenous line is typically inserted after inhalational induction, unless it would be deemed unsafe to do so. Parental presence is most often beneficial in helping the child reach the operating room, since the ASD child knows and trusts their parent.<sup>1</sup>

Every attempt should be made to coordinate all procedures, tests and laboratory work during a single anesthetic, if possible, to minimize the trips to the hospital and repeat need for additional preparation and coordination.

medication	dose	notes
Midazolam (GABA-A agonist)	PO 0.5 mg/kg (Max 15 mg) IN 0.3 mg/kg (Max 10 mg) IV 0.1 mg/kg (Max 2 mg)	
Ketamine (NMDA antagonist)	PO 1-3 mg/kg IN 1-5 mg/kg (Max 50 mg) IV 0.3 mg/kg (Max 20 mg) IM 3-5 mg/kg	<b>Negative effects:</b> emergency delirium, disorientation, sensory and perceptual illusions and vivid dreams, nausea/vomiting, nystagmus, hypersalivation
Dexmedetomidine (alpha-2 agonist)	PO 2-4 mcg/kg IN 1-2 mcg/kg IV 0.5-2 mcg/kg	<b>Negative effects:</b> hypotension, bradycardia

table 1.

### anesthesia for procedure

The anesthesiologist's approach to an ASD patient depends on the severity of the disorder, and they tailor the anesthetic depending on the procedure.<sup>1</sup> Effective analgesia should attempt to decrease need for oral pain medications postoperatively and may include a multimodal approach of acetaminophen, anti-inflammatories, opioid medications, and possibly regional anesthesia (if appropriate). Additionally, with knowledge of many patients' oral aversions, effective control of risk of nausea and emesis is imperative. Typically patients will receive prophylaxis medications, as well as intraoperative hydration to decrease the risk of nausea postoperatively.

### arrival to recovery room

Appropriate use of parents in the postanesthetic care unit can facilitate the transition from surgery to

recovery.<sup>1</sup> For incidence, it is hard to distinguish between pain, nausea, anxiety or emergence delirium as ASD patients regain consciousness.<sup>3</sup> Valuable information for recovery room staff is understanding a patient's typical response and expression to pain. ASD patients are 50% less likely to complain of pain, and are likely to have similar postoperative pain experiences to patients without ASD.<sup>11</sup> The FLACC (Face, Legs, Activity, Cry, Consolability) scale is recommended to assess pain.<sup>12</sup>

Additionally, the use of familiar terms and simplistic language is beneficial in the recovery process. Typically, ASD patients are best served by early removal of intravenous cannula and allowing them to recover in a quiet room with parents and comfort items present. Children who are reunited with their parents sooner require less pain medication and are discharged earlier in ambulatory settings.<sup>1</sup>

### summary

The perioperative environment poses challenges for ASD children due to changes in their daily routines, sensitivities to sensory input, and communication difficulties. Parents of ASD children are the experts and best advocates for the care their child receives. It is important for staff to recognize the signs that indicate an increasing level of stress, avoid triggering factors, use activities that reduce stress, and optimize the environment during the perioperative course. Patients with ASD require more consideration in the perioperative process, to include priority scheduling, decreased wait times, sensory accommodations and early discharge.

## references

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA: American Psychiatric Association; 2013.
2. Cote C, Lerman J, Anderson B. *A Practice of Anesthesia for Infants and Children*. 6th ed. Elsevier; 2019.
3. Lee LC, Harrington RA, Chang JJ, Connors SL. Increased risk of injury in children with developmental disabilities. *Research in Developmental Disabilities*. 2008;29(3):247-255.
4. Swartz JS, Amos KE, Brindas M, Girling LG, Ruth Graham M. Benefits of an individualized perioperative plan for children with autism spectrum disorder. *Pediatr Anesth*. 2017;27:856-862.
5. Taghizadeh N, Davidson A, Williams K, Story D. Autism spectrum disorder (ASD) and its perioperative management. *Paediatr Anaesth*. 2015;25:1076-1084.
6. Mills B. In the doctor's office: A parent perspective. *Pediatric Clinics of North America*. 2012;59:13-18.
7. Elliott AB, Holley AL, Ross AC, Soleta AO, Koh JL. A prospective study comparing perioperative anxiety and posthospital behavior in children with autism spectrum disorder vs typically developing children undergoing outpatient surgery. *Pediatr Anesth*. 2018;28:142-148.
8. Shapiro M, Melmed RN, Sgan-Cohen HD, Parush S. Effect of sensory adaptation on anxiety of children with developmental disabilities: A new approach. *Pediatr Dent*. 2009 May-Jun;31(3):222-8.
9. Cermak SA, Stein Duker LI, Williams ME, Dawson ME, Lane CJ, Polido JC. Sensory adapted dental environments to enhance oral care for children with autism spectrum disorders: A randomized controlled pilot study. *J Autism Dev Disord*. 2015;45(9):2876-2888.
10. Arnold B, Elliott A, Laohamroonvorapongse D, Hanna J, Norvell D, Koh J. Autistic children and anesthesia: Is their perioperative experience different? *Paediatr Anaesth*. 2015;25:1103-1110.
11. Vlassakova BG, Emmanouil DE. Perioperative considerations in children with autism spectrum disorder. *Curr Opin Anaesthesiol*. 2016 Jun;29(3):359-66.

## author



### Sean Antosh, MD

Sean Antosh, MD, is a board-certified pediatric anesthesiologist. He received his medical degree from the University of Cincinnati College of Medicine. He completed his anesthesiology residency at the Hospital of The University of Pennsylvania and pediatric anesthesiology fellowship at Cincinnati Children's Hospital Medical Center. He has clinical interests in improving the perioperative experience and care of children with autism spectrum disorders. Recently he was appointed clinical director of special needs patient experience for the department of pediatric anesthesiology at Dayton Children's.

## CME questions

1. Which of the following would be least appropriate when scheduling a patient for an elective surgery?
  - a. Scheduling an outpatient EKG to be done while the patient is anesthetized
  - b. Scheduling the patient as the last case of the day
  - c. Scheduling the patient to come in 60 minutes prior to the surgery compared to the standard 90 minutes
2. Multimodal analgesia should be used in patients with ASD.
  - a. True
  - b. False
3. Individualized coping plans improve patient outcomes.
  - a. True
  - b. False

# modernization in chest wall malformation treatment

by Arturo Aranda, MD, FACS



## learning objectives

Following the completion of this article, the reader should be able to:

1. Recognize the different presentations of chest wall deformities.
2. Understand the clinical features of the most common chest wall deformities.
3. Learn the most advanced adjuvants to correct these malformations.

## introduction

Chest wall malformations are a consequence of abnormal growth of the thoracic cavity. There are five main types: Pectus excavatum, pectus carinatum, Poland syndrome, sternal cleft and other syndromes. Approximately 66% of patients with Marfan syndrome have pectus excavatum or carinatum.

The most common chest wall deformity is pectus excavatum which account for 88% of all chest wall malformations.<sup>1</sup> The rate is 2.6% in children 7-14 years old.<sup>2</sup> Pectus carinatum is the second most common and occurs in about 0.6% of children with a 4:1 male-to-female ratio. The symptoms of these two vary from only cosmetic and psychological concerns to arrhythmias.

Poland syndrome, sternal cleft and Jeune thoracic dystrophy are all significantly rarer, but with more severe symptoms.

The pathophysiology of the overgrowth in chest wall malformations is not known. It can be associated with a syndrome, although 90% are sporadic. The most common associated syndromes are Marfan, Ehler-Danlos and Noonan.<sup>5,6,7</sup> In this article, we will focus on pectus excavatum and pectus carinatum.

**pectus excavatum**

Pectus excavatum (PE) is a concave deformity of the sternum with a posterior deflection of the sternum and adjacent cartilage (figures 1 and 2).

**assessment**

The consequence of PE on exercise is controversial. There is a clear effect on pulmonary function with a reduction in the forced volume of expiration in one second (FEV1) and forced vital capacity without a major effect on total lung capacity (TLC). Cardiac stroke volume is reduced when the patient is upright but not supine. The net effect is a reduction in the ability to perform aerobic exercise.<sup>8,9</sup>

Besides this effect on exercise tolerance, there can be chest wall pain and shortness of breath that can be associated with the progression of the deformity. Finally, not all patients report symptoms and some high-functioning athletes do not wish to consider an intervention.

Imaging, pulmonary function tests and echocardiogram are obtained as well as the Haller index calculation to determine if a patient is a candidate for surgical repair. The Haller index is the ratio of the transverse measurement of the chest over the anteroposterior distance from the back of the sternum to the anterior edge of the vertebrae. A ratio greater than 3.2

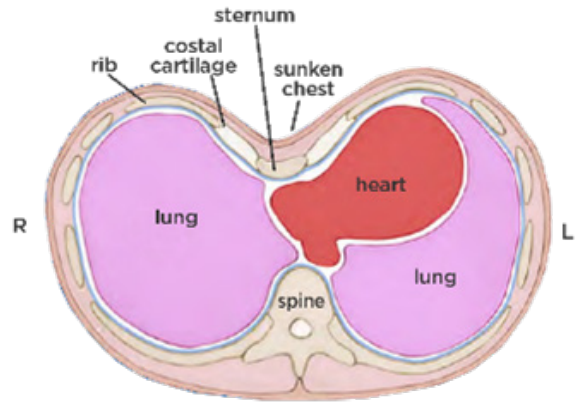


**figure 1.** Pectus excavatum causes a caved-in chest. Sometimes the ribs can flare out.

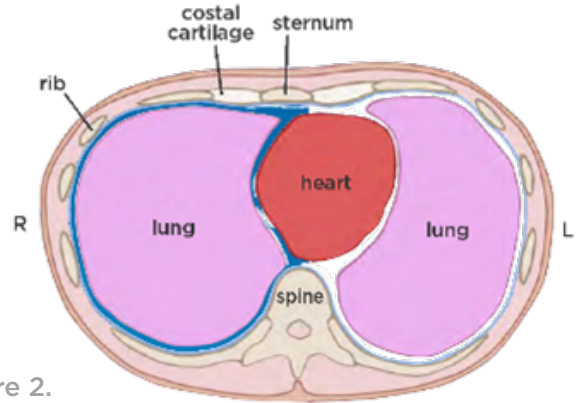
suggests that operative intervention would be appropriate.<sup>10</sup>

A multidisciplinary approach has been proven to decrease postoperative pain and length of stay, and to increase overall satisfaction. Advanced pain team and physical therapy are vital to improved postoperative progress.

**pectus excavatum chest**



**normal chest**



**figure 2.**

**treatment**

Dayton Children’s offers a non-operating option. The vacuum bell (image 1 and 2) was designed to correct the pectus excavatum by using negative pressure over one to two years. This device is used as an alternative to surgery, especially for younger patients. The child is

measured with 3D scanning technology, and then with one of the devices to choose the best size and to confirm that the patient is a candidate for this therapy. In the follow up consults, the pressure is adjusted to ensure appropriate correction.

**image 1.**

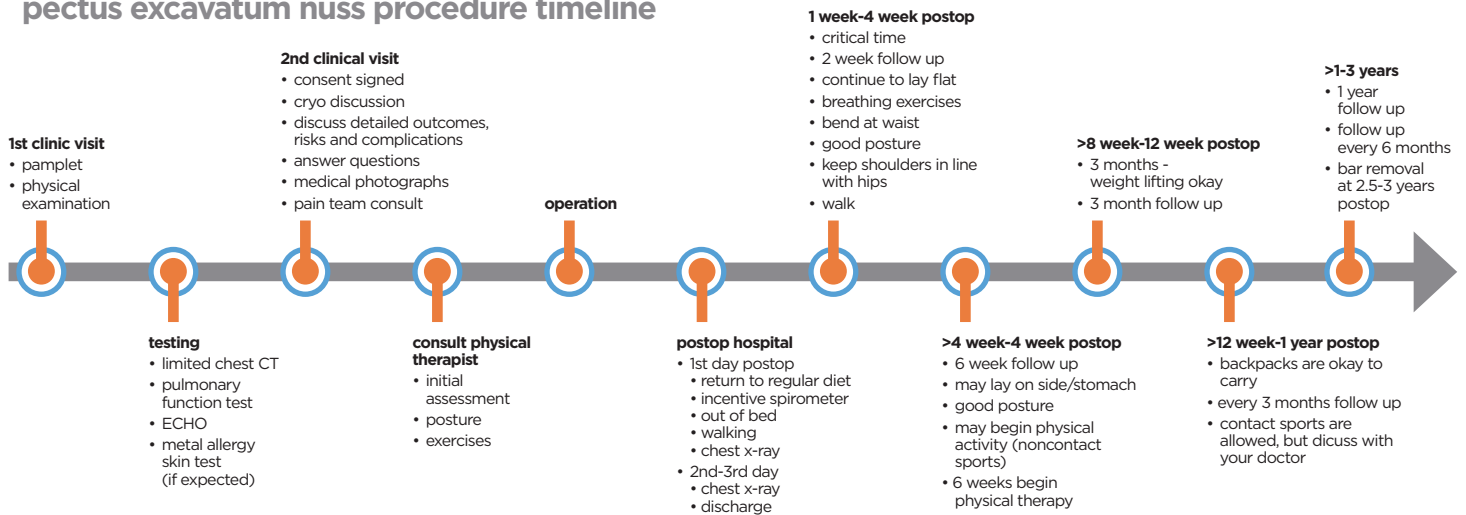


**image 2.**



There are several models and sizes to best fit each patient as show in images 1 and 2.

## pectus excavatum nuss procedure timeline



**table 1.** The ideal time to operate on PE is between 12 and 18 years of age, because it is more difficult to bend the sternum of older patients and they have more pain and complications.

If the vacuum bell is not successful in reducing the pectus excavatum or the child is not a candidate, then surgery is the next step. The timeline used at the Dayton Children's chest wall center is illustrated in table 1.

The ideal time to operate on PE is between 12 and 18 years of age, because it is more difficult to bend the sternum of older patients and they have more pain and complications.

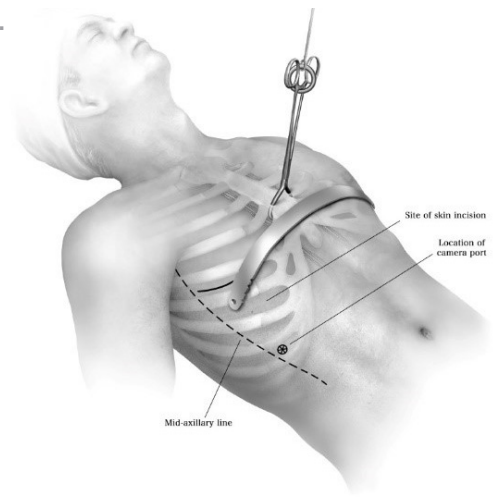
The surgery is a minimally invasive repair of pectus excavatum (MIRPE). This involves placing temporary intrathoracic support bars under the sternum. The bars are then removed after two to three years.<sup>11</sup> (figures 3 and 4)

Pain control can be challenging, but the most recent advances include cotreatment with a pain team and intercostal cryoablation, decreasing narcotic use. Cryoablation is done by the surgeon

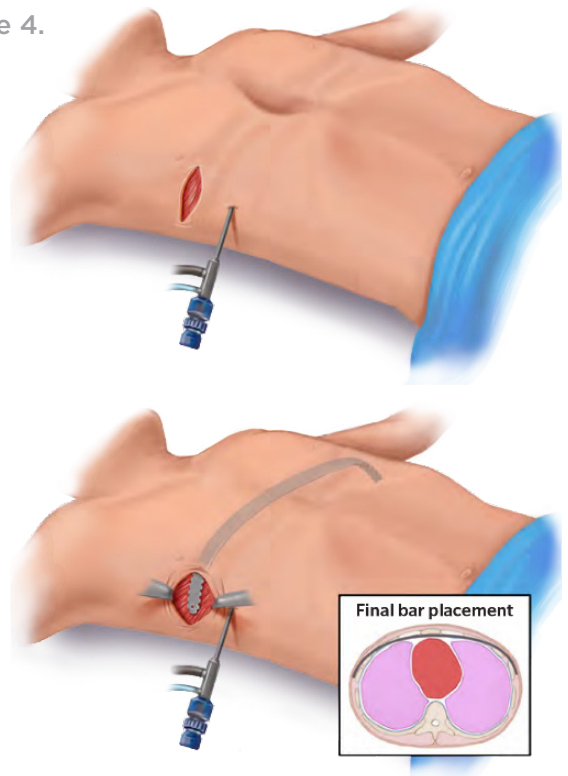
during the operation under direct vision. This consists of using extreme cold to freeze the intercostal nerves inducing axonotmesis without harming the perineurium or epineurium. This provides short- and long-term pain control as recovery via axonal regeneration through the perineurial canal takes place at a rate of 1-3mm/day.<sup>12,13</sup> These advances also decrease length of stay.

The operation is done under general anesthesia. Thoracoscopic equipment is used to enter and visualize the chest. The cryoablation probe is introduced through one of the instrument port sites and sequential freezing of intercostal nerves is performed. Three incisions total are made. Careful measurement of the chest wall is done and consequently the treatment bars. Then, an external sternal elevator

**figure 3.**

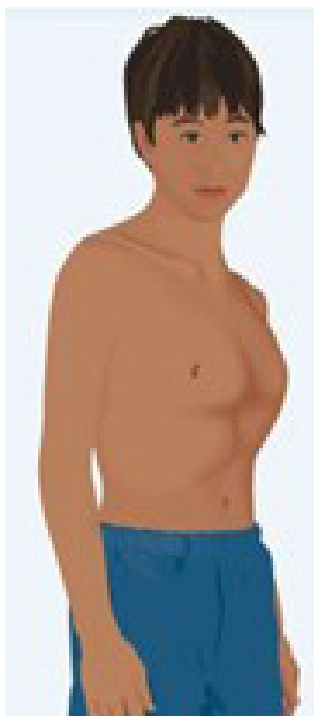


**figure 4.**



**figures 3 and 4.** Intrathoracic support bars being placed under the sternum





**figure 5.** Pectus carinatum causes the chest to jut out

device is used to increase the space between the sternum and pericardium to safely pass a guide bar under direct thoracoscopic vision. Finally, the treatment bar is placed and secured. Often two bars are needed for an appropriate correction.

Postoperatively the patient is urged to continue with breathing exercises and to have good posture. Return to physical activity (non-contact sports) happens between four and eight weeks. By 3 months, the patient is allowed to do weightlifting.



**figure 6.** Custom pectus carinatum brace

### **pectus carinatum**

Pectus carinatum (PC) is a convex protrusion with anterior deflection of the sternum, commonly referred to as pigeon chest (figure 5). It is typically present at birth; however, it may be very subtle and not recognized until later age. It usually gets worse with the first major growth spurt.

Like PE, it can be associated with several disorders, most notably Marfan syndrome and scoliosis. Approximately 1 in 4 patients have a family history and 10-20% have scoliosis, implying that there may be a connective tissue abnormality.

Unlike PE, there are no breathing problems, but patients commonly have worries about appearance and chest wall pain. There is a significant psychological impact. The fact that these patients are self-conscious about their

appearance may be just as debilitating as cardiopulmonary symptoms. PC can present as either symmetric or asymmetric protrusion with or without rotation of the sternum.

A one-size-fits-all brace has been used to treat PC, but recently a new and smarter brace system has been available. This brace is custom made after a 3D scanning of the chest; it is low profile and has dynamic adjustments based on pressure measurements (figure 6). This allows for a faster resolution of the deformity with less burden of use. This treatment is successful in 88% of patients.

The success of bracing depends on patient compliance. And compliance depends on the patient's pain or discomfort with the brace, participation in sports, or self-consciousness. If the patient sees

initial improvement from the brace in the first three months, they are more likely to complete the course of treatment.<sup>14</sup>

Younger patients have better bracing results because of chest wall compliance but are more likely to have PC recur in puberty or in a growth spurt. The recommended time for bracing is around 11-14 years old.

Surgical repair is rarely done for patients who have failed bracing, or with symptoms of tachypnea, decreased exercise endurance or pain with exercise.

### **summary**

Pectus excavatum and pectus carinatum are the most common chest wall deformities. There have been recent advances in technologies to treat these deformities. For PE, cryoanalgesia and a multidisciplinary team approach have improved outcomes. For PC, dynamic bracing has decreased the time for correction and compliance. At the Dayton Children's chest wall malformation center, we offer the most advanced solutions with very high patient satisfaction.

## references

1. Obermeyer RJ, Goresky MJ. Chest wall deformities in pediatric surgery. *Surgical Clinics*. 2012;92(3):669-84.
2. Coskun ZK, Turgut HB, Demirsoy S, Cansu A. The prevalence and effects of pectus excavatum and pectus carinatum of the respiratory function in children between 7-14 years old. *Indian J Pediatr*. 2010;77(9):1017-9.
3. Desmarais TJ, Keller MS. Pectus carinatum. *Curr Opin Pediatr*. 2013;25(3):375-81.
4. Frantz FW. Indications and guidelines for pectus excavatum repair. *Curr Opin Pediatr*. 2011;23(4):486-91.
5. Cobben JM, Oostra RJ, van Dijk FS. Pectus excavatum and carinatum. *Eur J Med Genet*. 2014;57(8):414-7.
6. Kelly RE, Goresky MJ, Obermeyer R, et al. Twenty-one years of experience with minimally invasive repair of pectus excavatum by the Nuss procedure in 1215 patients. *Ann Surg*. 2010;256(6):1072-81.
7. Kitzot D, Schwabbegger AH. Etiology of chest wall deformities—a genetic review for the treating physician. *J Pediatr Surg*. 2006;41(10):1699-703.
8. Malek MH, Berger DE, Marelich WD, et al. Pulmonary function following surgical repair of pectus excavatum: A meta-analysis. *Eur J Cardiothorac Surg*. 2006;30(4):637-43.
9. Kelly RE, Lawson ML, Paidas CN, et al. Pectus excavatum in a 112-year autopsy series: Anatomic findings and the effect on survival. *J Pediatr Surg*. 2005;40(8):1275-8.
10. Kelly RE. Pectus excavatum: Historical background, clinical picture, preoperative evaluation and criteria for operation. *Semin Pediatr Surg*. 2008;17(3):181-93.
11. Dawn EJ, Velazco S. Minimally invasive pectus excavatum repair. *Operat Tech in Thor and Cardiovasc Surg*. 2018;23(4):198-215.
12. Cadaval Gallardo C, Martinez J, Martinez-Ferro M. Thoracoscopic cryoanalgesia: A new strategy for postoperative pain control in minimally invasive pectus excavatum repair. *Cir Pediatr*. 2020;33(1):11-15.
13. Aiken TJ, Stahl CC, Lemaster D, Casias TW. Intercostal nerve cryoablation is associated with lower hospital cost during minimally invasive Nuss procedure for pectus excavatum. *Journal of Pediatric Surgery*. 2021;10:1841-1845.
14. Kang DY, Yung J, Chung S, et al. Factors affecting patient compliance with compressive brace therapy for pectus carinatum. *Interact Cardiovasc Thorac Surg*. 2014;10(6):900-3.

## author



### Arturo Aranda, MD, FACS

Arturo Aranda, MD, FACS, is chief, division of pediatric surgery, at Dayton Children's. He is also the chairman of surgery, professional staff. He has special interest in complex neonatal malformations, and advanced minimally invasive and cancer surgeries. He is the associate program director of surgery residency at Wright State University and a member of the Scientific Committee of the Pacific Association of Pediatric Surgeons. Dr. Aranda also serves in committees in the American Pediatric Surgery Association and American College of Surgeons. He is board certified by the American Board of Surgery.

## CME questions

4. Pectus excavatum can affect exercise tolerance by cardiac stroke reduction when upright.
  - a. True
  - b. False
5. Cryoablation consists of freezing intercostal nerves to provide short- and long-term pain control.
  - a. True
  - b. False
6. Pectus carinatum is usually corrected with surgery.
  - a. True
  - b. False

# sudden cardiac arrest in pediatric and adolescent patient populations

by Elizabeth Mitchell, MD



# learning objectives

Following the completion of this article, the reader should be able to:

1. Recognize the most common causes of sudden cardiac arrest among children and adolescents.
2. Describe the importance, as well as the limitations, of routine pre-participation evaluation.
3. Review the importance of preventative measures, such as high-quality bystander CPR and early AED use, to reduce mortality from sudden cardiac arrest.

**Sudden cardiac arrest (SCA), characterized by the abrupt and unexpected loss of cardiac function, is a rare but devastating cause of morbidity and mortality in pediatric and adolescent patients. SCA is typically due to a heart rhythm abnormality, such as ventricular tachycardia, ventricular fibrillation or pulseless electrical activity. This sudden loss of organized cardiac activity can cause syncope, sudden collapse and even sudden cardiac death (SCD). Detection of an event, early initiation of cardiopulmonary resuscitation (CPR), and timely use of an automatic external defibrillator (AED) can prevent a sudden cardiac arrest from evolving into sudden cardiac death.<sup>7</sup>**

**Primary prevention of such episodes, through the identification of at-risk individuals, is widely agreed upon as being both reasonable and appropriate. The predominant focus of such discussions has primarily centered around the screening of competitive athletes prior to participation, with the goal of reducing the incidence of SCA by selective modification or disqualification of high-risk individuals.<sup>1,5-7</sup> In the United States, this has historically been achieved by a thorough pre-sports participation history and targeted physical exam. More recently, the topic of additional cardiac evaluation, with routine pre-participation EKG screening, has been the topic of considerable debate.<sup>4</sup>**

Sudden cardiac arrest and/or death is rare, with a reported incidence of 0.5 to 2.5 per 100,000 person-years.<sup>2-5</sup> Sudden cardiac death occurs more commonly in males than females, with a reported ratio of approximately 6.5-9:1.<sup>14,5</sup> Interestingly the incidence of SCD does not differ significantly when comparing athletes to non-athletes.<sup>5</sup> SCD occurs in individuals of all racial and ethnic backgrounds, and can occur during any sport.<sup>1</sup> The

most common activities cited include football and basketball in the United States, and soccer in Europe.<sup>15</sup> The absolute number of deaths attributed to SCA in athletes aged 8 to 39 years is approximately 75 deaths per year, fewer than almost all other causes of death in a similar age group.<sup>15</sup> Deaths attributed to motor vehicle accidents, homicide, suicide, cancer, and drowning all occur more frequently<sup>15</sup> (figure 1).

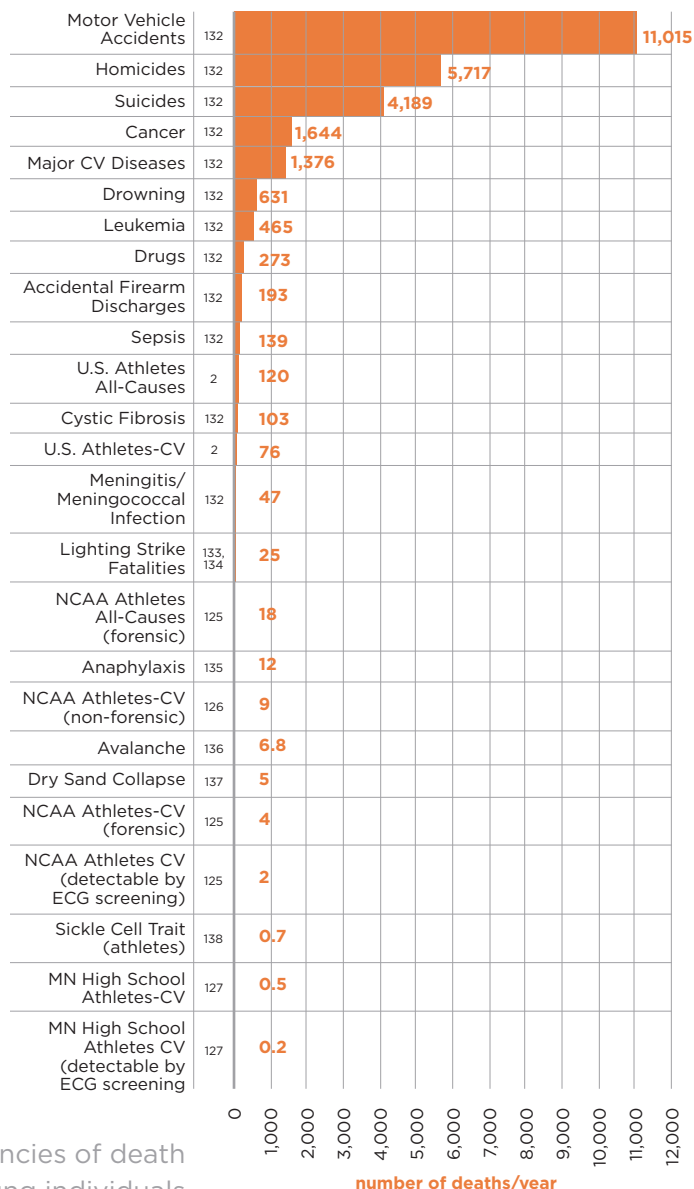
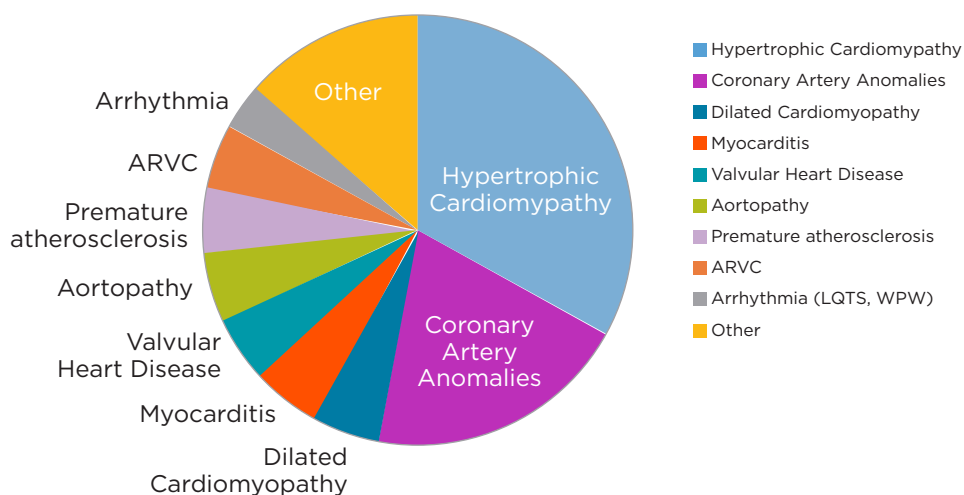


figure 1. Comparative frequencies of death attributable to all causes in young individuals aged < 25 years. CV indicates cardiovascular; MN, Minnesota; and NCAA, National Collegiate Athletic Association.<sup>5</sup>

While SCA in children and adolescents is quite rare, there is no doubt that any episode is devastating for the family, as well as the community. In an effort to prevent such tragic episodes, several organizations, including the American Heart Association (AHA), American College of Cardiology (ACC) and the American Academy of Pediatrics (AAP), recommend a pre-participation risk assessment. A pre-sports participation evaluation, including review of a patient's past medical history and targeted physical exam, is usually required before school-aged children can participate in organized sports.<sup>4,6</sup> The aim of this surveillance is to reduce morbidity and mortality associated with exertion by modifying participation or disqualifying high-risk individuals from participation in competitive athletics. In certain circumstances, primary prevention of SCD with implantable cardioverter-defibrillators (ICDs) is advised.<sup>5</sup> ICD placement for appropriate individuals is recommended in addition to activity modification or restriction; placement of an ICD does not qualify high-risk individuals for participation in competitive athletics.

## causes of sudden cardiac death in athletes



**figure 2.** Causes of sudden cardiac death in athletes. ARVC indicates arrhythmogenic right ventricular cardiomyopathy; LQTS, long QT syndrome; WPW, Wolff-Parkinson-White syndrome.<sup>5</sup>

Various underlying medical conditions can increase the risk for sudden cardiac arrest. High-risk individuals, such as patients with hypertrophic cardiomyopathy, coronary artery abnormalities, Marfan syndrome and long QT syndrome (LQTS), are at an increased risk of SCA with exertion. SCD in athletes aged 12-35 years has previously been well studied.<sup>5</sup> Hypertrophic cardiomyopathy (HCM) is the most common cause of SCD in athletes, and consistently accounts for approximately one-third of cases.<sup>4,5</sup> Coronary artery abnormalities, including anomalous coronary artery origin, account for approximately 15-20% of cases.<sup>5</sup> Dilated cardiomyopathy, myocarditis, valvular heart disease,

aortopathy —such as Marfan syndrome — and other subtypes of congenital heart disease each account for approximately 5% of cases.<sup>5</sup> Primary cardiac rhythm abnormalities—such as channelopathies, including long QT syndrome (LQTS) and ventricular pre-excitation or Wolff-Parkinson-White syndrome—account for 2-3% of cases<sup>5</sup> (figure 2).

Individuals considered high risk for SCA may be identified with a detailed history and targeted physical exam. Patients may have a family history of sudden cardiac death, as may be the case in certain cardiomyopathies or LQTS, an abnormal cardiac exam, as may be the case in HCM or valvular heart disease, or features of a particular

genetic syndrome, such as Marfan syndrome.<sup>1</sup> Other causes of SCA, such as coronary artery anomalies and heart rhythm abnormalities, may be more difficult to detect. Patients may be asymptomatic or have only vague, non-specific symptoms before an episode of SCA. In fact, most patients at risk for sudden cardiac death do not have any identifiable symptoms before an arrest.<sup>4,6</sup>

In order to preemptively identify such high-risk individuals, the American Academy of Pediatrics (AAP) advocates for a routine, pre-participation evaluation (PPE). Ideally this evaluation should be performed by the patient's primary care provider to allow for

continuity of care and a thorough knowledge of the patient's past medical and family history.<sup>6</sup> The PPE should include a review of the patient's past medical history as well as a targeted cardiovascular, neurological, musculoskeletal, pulmonary and psychological evaluation. In addition, female athletes require additional history regarding menstruation and evaluation for the female athlete triad.<sup>6</sup> The PPE should be performed in the primary care provider's office to allow for adequate privacy and in a quiet location to allow optimal cardiac auscultation.<sup>6</sup> Mass screenings should typically be avoided due to lack of privacy, the potential for incomplete medical history, and inadequate cardiac auscultation due to noise.<sup>6</sup>

The AHA has provided recommendations for a 14-point history and physical exam.<sup>1,4-6</sup> This includes a review of the patient's vital signs, including their height, weight, body mass index (BMI) and blood pressure. Cardiac exam includes auscultation with provocative maneuvers to elicit

evidence of outflow tract obstruction. This includes listening to the patient in both supine and standing positions (or with and without Valsalva maneuver).<sup>6</sup> Palpation of the patient's pulses, including assessment of the radial and femoral pulses simultaneously, should also be performed (table 1).

Red flags identified during the PPE should prompt additional evaluation, either by the patient's primary care provider or a cardiologist.<sup>6</sup> The following all warrant additional evaluation or referral to a cardiologist: Cardiac symptoms, such as chest pain, dizziness, syncope or shortness of breath; a personal history of myocarditis or Kawasaki disease; or concerning family history, including a history of cardiomyopathy, Marfan syndrome, arrhythmias or early sudden cardiac death (before the age of 50 years). Abnormalities noted on physical exam, including elevated BMI, elevated blood pressure, pathologic murmurs, or diminished pulses should also prompt additional evaluation.<sup>1</sup> At this time, universal cardiac testing, including EKG and/or echo, are not routinely advised as part of the PPE.<sup>1,2,4-6</sup>

<b>Medical history*</b>
<b><i>Personal history</i></b>
<ol style="list-style-type: none"> <li>1. Chest pain/discomfort/tightness/pressure related to exertion</li> <li>2. Unexplained syncope/near-syncope<sup>†</sup></li> <li>3. Excessive and unexplained dyspnea/fatigue or palpitations, associated with exercise</li> <li>4. Prior recognition of a heart murmur</li> <li>5. Elevated systemic blood pressure</li> <li>6. Prior restriction from participation in sports</li> <li>7. Prior testing for the heart, ordered by a physician</li> </ol>
<b><i>Family history</i></b>
<ol style="list-style-type: none"> <li>8. Premature death (sudden and unexpected, or otherwise) before 50 years of age attributable to heart disease in <math>\geq</math> relative.</li> <li>9. Disability from heart disease in close relative &lt;50 years of age</li> <li>10. Hypertrophic or dilated cardiomyopathy, long-QT syndrome, or other ion channelopathies, Marfan syndrome, or clinically significant arrhythmias; specific knowledge of genetic cardiac conditions in family members</li> </ol>
<b><i>Physical examination</i></b>
<ol style="list-style-type: none"> <li>11. Heart murmur<sup>‡</sup></li> <li>12. Femoral pulses to exclude aortic coarctation</li> <li>13. Physical stigmata of Marfan syndrome</li> <li>14. Brachial artery blood pressure (sitting position)<sup>◇</sup></li> </ol>

AHA indicates American Heart Association

\* Parental verification is recommended for high school and middle school athletes.

<sup>†</sup> Judged not to be of neurocardiogenic (vasovagal) origin; of particular concern when occurring during or after physical exertion.

<sup>‡</sup> Refers to heart murmurs judged likely to be organic and unlikely to be innocent; auscultation should be performed with the patient in both the supine and standing positions (or with Valsalva maneuver), specifically to identify murmurs of dynamic left ventricular outflow tract obstruction.

<sup>◇</sup> Preferably taken in both arms.

**table 1.** The 14-Element AHA Recommendations for Preparation Cardiovascular Screening of Competitive Athletes<sup>5</sup>

Unfortunately, pre-participation screening will never prevent all episodes of SCA/SCD in athletes. Given the tragic nature of SCA, and the inability of history and physical exam alone to accurately identify all patients at risk for SCA, some communities have advocated for including an EKG as part of a routine pre-participation evaluation. This recommendation is driven by the fact that pre-participation screening with history and physical examination alone may miss patients at high risk for SCA/SCD. As previously discussed, some patients, such as those with underlying channelopathies, ventricular pre-excitation, or even cardiomyopathy, may be asymptomatic and/or have a normal cardiac exam until an event or an arrest. Furthermore, in a particular region in Italy, some studies have demonstrated a reduction in sudden cardiac death in athletes after incorporating screening EKG in addition to the history and physical exam.<sup>5</sup> In 2005, the European Society of Cardiology recommended screening EKGs for athletes prior to participation.<sup>4,5</sup> These recommendations were based on the data from Italy suggesting a major reduction in mortality from SCD when

screening EKGs were initiated as part of the pre-participation process. However, this reduction in SCD has been attributed to the identification of athletes with arrhythmogenic right ventricular cardiomyopathy or dysplasia (ARVC/D), which is endemic to this particular population.<sup>1</sup> In the United States, the incidence of ARVC is much less common than either hypertrophic cardiomyopathy or coronary artery abnormalities.<sup>5</sup>

The discussion surrounding the utilization of EKG as part of the screening process is complex. Sudden cardiac arrest and sudden cardiac death are rare, even among the highest risk individuals, and the population to screen would be quite large, with some estimates as high as 10 million athletes.<sup>2,5</sup> Additionally, the EKG as a screening test for an otherwise asymptomatic individual is neither sensitive nor specific.<sup>1</sup> False positive EKG results occur in at least 10-15% of competitive athletes, even when criteria, such as the 2010 European Society of Cardiology Guidelines or Seattle Criteria, are used to further define what constitutes an abnormality.<sup>4,5</sup> These perceived abnormalities may lead to the unnecessary restriction of an athlete and prompt additional

cardiac testing. The cost of this additional assessment, both psychosocially if an athlete is restricted, and financially, when additional testing or evaluation is pursued, adds to the cost consideration of universal EKG screening and is difficult to quantify.<sup>2,4</sup> In addition to false positive EKGs, false negative EKGs, when the EKG is interpreted as normal despite underlying pathology, are also more common than may be realized. An EKG may not identify some patients considered high risk, such as patients with coronary artery anomalies or underlying cardiomyopathy. Some reports suggest that up to 30% of patients with known hypertrophic cardiomyopathy will have a normal EKG despite echocardiographic evidence of underlying disease.<sup>5</sup> Furthermore, EKG abnormalities may be transient or may develop over time, as may be the case with HCM, LQTS or ventricular pre-excitation, suggesting that a single EKG cannot exclude the risk of significant heart disease later in life.<sup>2</sup> Additionally there are ethical implications to consider if EKG screening is only offered to competitive athletes, especially considering that rates of SCD do

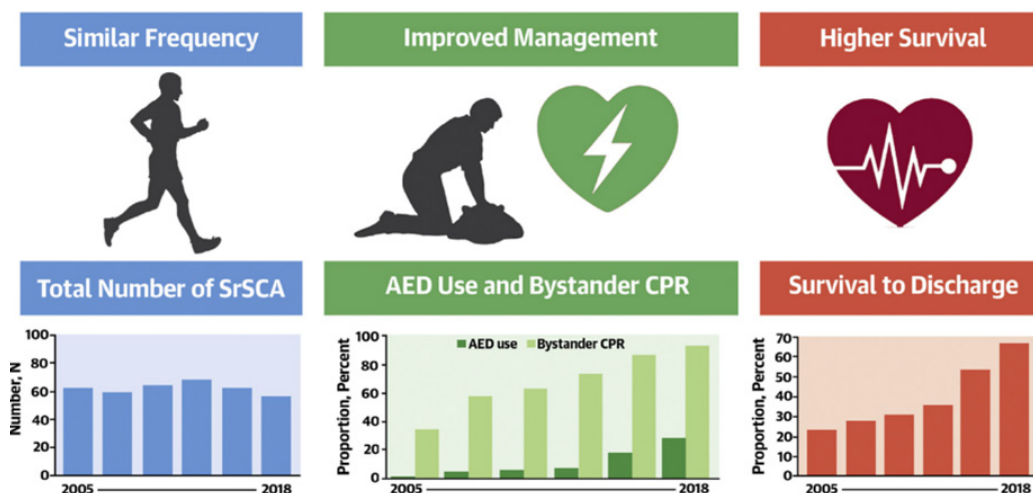
not differ significantly in young athletes compared to non-athletes.<sup>5</sup> The ethical implications of universal EKG screening only for young athletes is outside of the scope of this discussion.

The absolute number of deaths attributed to SCA in athletes each year is low, approximately 75 deaths per year.<sup>1,5</sup> This is less than almost all other causes of death in a similar age group. Deaths attributed to preventable causes, such as motor vehicle accidents, homicide, suicide and drowning, all occur more frequently.<sup>1,5</sup> This suggests that preventative measures, including attempts to reduce motor vehicle collisions, limit gun violence, and improve mental health resources, may be more effective in reducing the number of pediatric and adolescent deaths. This is not to suggest that the PPE should be eliminated. Rather, this is an opportunity for providers to screen for and counsel patients and families about the importance of safe driving, mental health concerns, and safe gun storage, in addition to a thorough cardiac assessment.

Recognizing the limitations of the PPE and the inability for any screening process to identify all individuals at

risk for SCA, attempts to improve survival after SCA are important. A recently published adult study demonstrated that an improvement in resuscitation efforts significantly reduced the number of SCD events after a sports-related SCA. This study evaluated the incidence of sports-related SCA in competitive athletes aged 18-75 years over two time periods, 2005-2010 and 2011-2018.<sup>7</sup> They evaluated both the presence or absence of known underlying heart disease as well as resuscitation efforts, including initiation of bystander CPR, AED use, and initial heart rhythm assessment by the AED if utilized.<sup>7</sup> Additionally data about survival after SCA was collected. The incidence of SCA did not differ significantly during the study periods; however, rates of bystander CPR and AED use significantly increased over time.<sup>7</sup> This correlated with a significant increase in hospital survival (figures 3 and 4). This study underscores the importance of community education surrounding SCA and the value of training members of the community in basic life support (BLS), including the importance of high-quality CPR and AED use.

### Central illustration — evolution of sports-related sudden cardiac arrest, initial management and survival rate

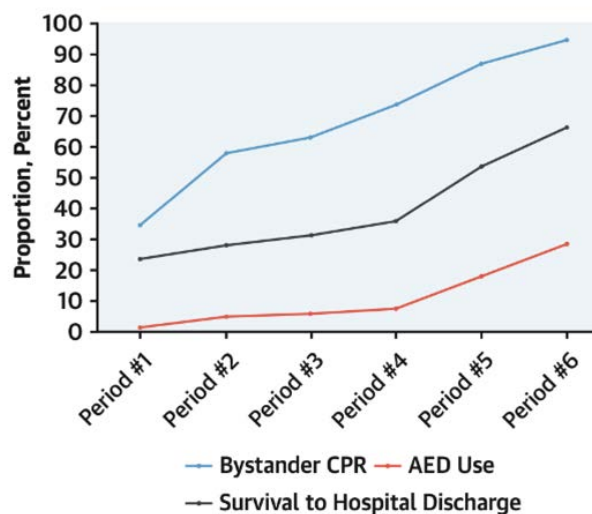


Karam, N. et al. *J Am Coll Cardiol.* 2022;79(3):238-246.

Total number of sports-related sudden cardiac arrest remained stable throughout the study period, while the rate of automated external defibrillator use and cardiopulmonary resuscitation increased steadily, associated with a 3-fold increase in its survival rate. AED = automated external defibrillator; CPR = cardiopulmonary resuscitation; SrSCA = sports-related sudden cardiac arrest.

**figure 3.** Evolution of sports-related sudden cardiac arrest frequency, initial management, and survival rate<sup>7</sup>

Sudden cardiac arrest is a rare and tragic event. Approaches to reduce the incidence of SCA are reasonable and appropriate. To date this has been achieved by a pre-participation history and physical exam. The PPE aims to identify individuals for additional testing and, if need be, may result in modification of participation or selective disqualification of high-risk individuals. The American Heart Association (AHA) and American Academy of Pediatrics (AAP) have not recommended routine pre-participation EKG screening, despite some communities advocating for its routine use. This recommendation is based on the low rates of SCD,



There was a steady increase in the rates of bystander CPR and AED use, together with a 3-fold increase in survival rate. AED = automated external defibrillator; CPR = cardiopulmonary resuscitation.

**figure 4.** Temporal trends through the six 2-year periods of time (2005-2018)<sup>7</sup>

even among high-risk individuals, the large cohort of individuals who would require screening, the cost associated with said screening, and the high rates of both false positive and false negative

tests. Additionally there is data to suggest that prioritizing other means of reducing SCD, such as increasing AED availability and improving bystander CPR, may significantly reduce mortality after sudden cardiac arrest.



## references

1. Maron BJ, Levine BD, Washington RL, Baggish AL, Kovacs RJ, Maron MS. Eligibility and disqualification recommendation for competitive athletes with cardiovascular abnormalities: Task Force 2: Preparticipation screening for cardiovascular disease in competitive athletes. A scientific statement from the American Heart Association and American College of Cardiology. *Circulation*. 2015;132(22):e267-72. doi: 10.1161/CIR.0000000000000238.

2. Rodday AM, Friedman JK, Alexander ME, et al. Electrocardiogram screening for disorders that cause sudden cardiac death in asymptomatic children: A meta-analysis. *Pediatrics*. 2012;129(4):e999-1010. doi: 10.1542/peds.2011-0643.

3. Jefferies JL. Sudden cardiac arrest and death in children. UpToDate. Accessed Dec 10, 2021. Updated Feb 16, 2022.

4. Schmeihil C, Malhotra D, Patel DR. Cardiac screening to prevent sudden death in young athletes. *Transl Pediatr*. 2017;6(3):199-206. doi: 10.21037/tp.2017.05.04.

5. Maron BJ, Friedman RA, Kligfield P, et al. Assessment of the 12-lead ECG as a screening test for detection of cardiovascular disease in healthy general populations of young people (12-25 years of age). A scientific

## author



### Elizabeth Mitchell, MD

Elizabeth Mitchell, MD, grew up in Cincinnati, Ohio. She graduated from Loyola University in Chicago, Illinois, and went to medical school at The Ohio State University. She completed a residency in pediatrics and fellowship in cardiology at Nationwide Children's Hospital in Columbus, Ohio, and has been with Dayton Children's since 2017. When she is not at work she enjoys bicycling and spending time with her husband and their three children.

statement from the American Heart Association and the American College of Cardiology. *Circulation*. 2014;130(15):1303-1334. doi: 10.1161/CIR.000000000000025.

## CME questions

7. Hypertrophic cardiomyopathy is the most common cause of sudden cardiac arrest in young athletes, accounting for approximately one-third of all cases.
  - a. True.
  - b. False.
8. The pre-participation evaluation should be performed:
  - a. In a mass screening event to promote efficiency and screen as many athletes as possible.
  - b. Only in male athletes because the risk of sudden cardiac arrest is much higher in men.
  - c. By the patient's primary care provider, in an office setting, utilizing the AHA 14-point history and physical exam form for assessment.
  - d. Only in athletes who are considered high risk for a sudden cardiac arrest.
9. Research has clearly demonstrated that a thorough pre-participation history, physical exam and screening EKG would be able to capture all patients at high risk of sudden cardiac arrest, and therefore an EKG should be considered an effective and reasonable screening tool in addition to the PPE.
  - a. True.
  - b. False.
10. Bystander CPR and early initiation of the AED have not been proven to be effective measures in reducing mortality after SCA.
  - a. True.
  - b. False.

6. Miller SM, Peterson AR. The sports preparticipation evaluation. *Pediatr Rev*. 2019;40(3):108-128. doi: 10.1542/pir.2016-0216.

7. Karam N, Pechmajou L, Narayanan K, et al.

Evolution of incidence, management, and outcomes over time in sports-related sudden cardiac arrest. *J Am Coll Cardiol*. 2022;79(3):238-246. doi: 10.1016/j.jacc.2021.11.011.



# pediatric mental health: reducing family distress and promoting strengths

by Bridget Jones, PsyD

## learning objectives

Following the completion of this article, the reader should be able to:

1. List commonly occurring pediatric mental health concerns.
2. Describe communication skills that are effective in reducing distress and readying patients and their families to receive help across a wide range of presenting concerns.
3. Describe strategies to reinforce strengths and promote emotional health in families affected by a child's mental health problem(s).

## introduction

Pediatric mental health disorders are defined as changes in cognition, behavior, emotion or social ability that develop in childhood or adolescence and cause significant distress or impairment.<sup>1</sup> The growing number of mental health concerns in children represents a public health crisis, with 1 in 6 children meeting criteria for at least one mental or behavioral health disorder,<sup>2</sup> and 1 in 5 adolescents seriously considering suicide.<sup>3</sup> Attention-deficit/hyperactivity disorder (ADHD), behavior problems, anxiety and depression are the most common occurring disorders in youth, with behavior problems being more common in young children and internalizing disorders (i.e., anxiety, depression) being more common in adolescents.<sup>4</sup> Early intervention for mental health concerns is crucial given that untreated mental illness increases the likelihood of long-term mental or physical illness, academic failure, social difficulties and risky behavior. In addition, it is important to consider the effects

of the COVID-19 pandemic on youth, including increased social isolation, potential illness or death of caregivers or other family members, and significant changes to school environment, among other factors.

Understanding the status of pediatric mental health disorders is important for all health care providers, regardless of specialty. Psychological factors, as well as adverse childhood experiences (ACEs) such as parental mental illness, homelessness and abuse, can have implications not only for mental health, but physical illness and prognosis.<sup>5</sup> In addition, routinely screening for mental and behavioral health concerns can improve preventative care, decreasing the likelihood of worsening symptoms. Families are more likely to disclose behavioral or mental health concerns with medical providers with whom they have a trusting relationship, making it even more necessary that all providers can adequately assess and refer for mental health concerns.

## **reducing family distress during difficult conversations**

Regardless of whether a child is struggling with mental health difficulties or coping with a physical illness or injury, the ways in which providers communicate with families about these issues can have significant implications. At the foundation, it is vital to utilize empathy during all discussions with patients and their families. Families often look to medical providers for direction and safety, and putting ourselves in the family's shoes can provide more humanistic and compassionate care. Empathy can not only increase the trust between provider and patient, which can lead to better understanding of symptoms and potential antecedents, but can also lead to higher likelihood of symptom improvement.<sup>6</sup>

Empathy begins with making sure families can adequately understand discussions around their care, especially given the complex medical content often discussed. To reduce confusion and ensure clarity, providers should use communication skills that ensure comprehension, such as objective interpreters for non-English speaking

families and language that can be understood by the average citizen (i.e., sixth grade reading level). All procedures, treatments, referrals and aspects of their care should be explained carefully. Having families repeat back their understanding may also be useful. An example of assessing patient understanding may be, "I know we covered a lot of things today. Do you mind telling me what you understood from our conversation, to make sure I communicated it clearly?"

In addition, to reduce potential stress or anxiety for youth, it may be helpful to speak directly to the child about their care (if agreed upon by caregivers). This begins with a simple introduction of the provider and specialty, making sure the patient understands the reason for their visit, using language they can understand. A psychologist may introduce themselves to a young patient by saying, "Hi, I'm Dr. Jones. I'm a psychologist. Do you know what that means? A psychologist is a type of doctor who talks to you about your thoughts and feelings." The amount of detail provided to the child will depend on the age. For example, young children may benefit from knowing

general information about diagnoses or treatments, potentially through the use of metaphors or imagery. Adolescents, given increased autonomy and understanding, may benefit from specific details about their care.

Empathy can also be communicated through active listening skills. Active listening can help the family feel heard and understood, and can help to determine potential triggers or antecedents of symptoms. For instance, when a provider listens carefully to a child, they may come to understand that a sleeping difficulty may be a result of watching television in their room until the early morning, rather than an organic difficulty requiring medication. Although providers are constantly juggling many balls at once and are pulled in many directions at any given moment, being present with patients can ensure that nothing is missed and reduce potential distress by families.

When it comes to reducing distress for families when assessing mental health, it is important for providers to exhibit confidence when assessing mental health and ACEs. Mental health and trauma are difficult and vulnerable subjects for both patients and their families to discuss,

due to the personal nature of these difficulties as well as social stigma. Therefore, if providers are able to ask difficult questions (e.g., assessing suicidal ideation) without hesitation, it can be destigmatizing and normalizing to patients. One way to begin this conversation is by providers asking the patient how their typical mood is, or ways in which their mood could potentially impact their physical symptoms. To assess potential trauma the patient has experienced, a provider may ask, "Has anything bad, sad or scary happened to you recently?"<sup>7</sup> This can be asked to the caregiver about their child as well. Provider confidence can be portrayed by simply not shying away from asking hard questions to patients, and knowing the follow-up protocol if the patient does endorse mental health or safety concerns.

## **promoting strengths in families during mental health difficulties**

According to family systems theory,<sup>8</sup> a family should be viewed as one emotional unit, meaning that the well-being of one individual in the family affects the well-being of the others. This is especially true for children and adolescents. Knowing this, mental health difficulties of one

child will likely have implications for the rest of the family. This presents an opportunity for providers to intervene and foster emotional resilience and strength during times of mental health difficulty.

Each individual family will have their own set of strengths, so providers should begin with assessing family culture to identify strengths. Some families may have a good daily routine that provides structure, while others may have cultural or religious practices that they engage in, which promotes shared enjoyment. Other families may have an invested and motivated parent or social supports that assist caregivers. It may be difficult for families to identify these attributes on their own, especially in times of crisis. However, every family has strengths that can be identified through guidance from providers. Once strengths are identified, providers can reinforce routinely using these strategies for families.

For caregivers who have difficulty identifying strengths, providers can recommend carving out quality time with their child during the week. During quality time, caregivers provide undivided attention to their child while engaging in a task that the child prefers. For

young kids, this may be coloring or playing with their favorite toys together. For adolescents, this may be going for a walk or cooking their favorite meal. By engaging in a preferred and enjoyable activity, the child will feel special because their caregiver is sharing in their world. Quality time can lead to increased communication and emotional connection, as well as a reduction or prevention of behavioral difficulties. The quality of the time shared together is more important than the amount of time, so even small amounts of time during the week (e.g., 10-15 minutes) can be recommended for busy schedules.

Another tool that can help promote emotional resiliency is emotion validation by caregivers. As previously stated, many school-aged children and adolescents may feel ashamed, scared or nervous to disclose mental health symptoms. Providers can offer caregiver education about validating the feelings their child may be experiencing. It can be powerful to hear that it is "OK" to feel sad, angry, scared or anxious, regardless of age. For kids to hear this from their parents or caregivers can provide feelings of safety. When caregivers are able to

explain that the feelings they are experiencing are reasonable, children are more likely to feel understood and supported. Not only does this reinforce disclosing mental health symptoms, but can promote other factors, such as emotion identification and regulation and greater satisfaction within caregiver-child relationships.<sup>9</sup>

While validating emotions is key to increasing support for children and adolescents, holding boundaries are also an important tactic for caregivers to use. Due to the nature of disorders like depression or anxiety, children and adolescents may have difficulty sleeping or eating, may not want to attend school, or may act out behaviorally. Although it is understandable that these situations may be occurring, caregivers should be able to confidently set or maintain boundaries. It should be expressed to caregivers that setting boundaries can be a form of love and safety. The world can be a difficult and sometimes scary place, especially for children experiencing distress or pain in the midst of a pandemic. Caregivers are in a unique position to keep their child's world from feeling increasingly chaotic by making sure they get

good sleep, eat regular meals, keep their routine, and understand that behavioral outbursts or aggression may not be productive outlets for emotions.

Lastly, caring for a child with a mental or physical illness can be incredibly taxing for a caregiver or parent. Similar to recommendations we provide to their children, providers can also recommend mental health therapy for caregivers as well. This is especially true for caregivers with their own mental health history or who are in high-risk social situations. Children rely on their parents and caregivers for most things, physical and emotional, so ensuring that caregivers put the oxygen mask on themselves in addition to their children is essential.

## **conclusion**

The current state of pediatric mental health in this country can feel dire, and yet providers are in a crucial position to help prevent worsening of symptoms by supporting the family system. Just as we all are struggling through the ongoing pandemic, so too are the kids we see daily. Actively listening and being present with a family can help to identify potential psychological factors at play, reduce distress felt by the family, and foster emotional resiliency.

## references

1. Beilharz JE, Paterson M, Fatt S, Wilson C, Burton A, Cvejic E, Lloyd A, & Vollmer-Conna U. The impact of childhood trauma on psychosocial functioning and physical health in a non-clinical community sample of young adults. *The Australian and New Zealand Journal of Psychiatry*. 2020;54(2): 185-194. 10.1177/0004867419881206
2. Bowen M. Family therapy in clinical practice. Jacob Aronson; 1978.
3. Centers for Disease Control and Prevention. Mental health surveillance among children - United States, 2005-2011. *MMWR*. 2013;62 (Suppl 2):1-35.
4. Centers for Disease Control and Prevention. Youth risk behavior survey (YRBS). 2019. <https://www.cdc.gov/yrbs>.
5. Decety J. Empathy in medicine: what it is, and how much we really need it. *Am Journal of Med*. 2020;133(5): 561-566. 10.1016/j.amjmed.2019.12.012
6. Ghandour RM, Sherman LJ, Vladutiu CJ, Ali MM, Lynch SE, Bitsko RH, Blumberg SJ. Prevalence and treatment of depression, anxiety, and conduct problems in U.S. children. *Pediatrics*. 2018;206: 256-267. 10.1016/j.jpeds.2018.09.021
7. Maine Health. Adverse childhood experiences/trauma: pediatric screening toolkit. 2021. <https://www.mainehealth.org/-/media/MaineHealth/PDFs/Clinical-Guidelines-and-Resources/ACEs/Pediatric-Screening-Toolkit.pdf>
8. Shenk CE, Fruzzetti AE. Parental validating and invalidating responses and adolescent psychological functioning: an observational study. *The Family Journal*. 2014;22(1):43-48. 10.1177/1066480713490900

## author



### Bridget Jones, PsyD

Bridget Jones, PsyD, is a pediatric psychologist in the Dayton Children's pediatrics clinic. She specializes in integrated pediatric primary care, early development, and adolescent mental health. Dr. Jones obtained her clinical psychology doctorate degree at Loyola University of Maryland in 2020. She completed both her internship and post-doctoral fellowship at MetroHealth Medical Center in Cleveland, specializing in pediatric psychology and integrated primary care. Dr. Jones' work at Dayton Children's focuses on increasing access to behavioral health and preventative care.

## CME questions

11. Providers should consider cultural and family context when discussing medical or psychological treatment and should adjust language or approaches as such.
  - a. True.
  - b. False.
12. Providers should ask specific and direct questions about difficult topics, such as trauma or suicidal ideation.
  - a. True.
  - b. False.
13. To help promote individual emotional resiliency, providers should:
  - a. Identify unique family strengths
  - b. Recommend family quality time between caregivers and youth
  - c. Provide emotional validation while also maintaining boundaries
  - d. All of the above



# Dayton Children's updates

## Dayton Children's opens pediatric primary care location in the Hope Center



As part of Dayton Children's vision of reinventing the path to health care for children, the hospital expanded its pediatric primary care practice into an area of the region that continues to see health disparities. Dayton Children's Pediatrics opened a new location in the Hope Center for Families on Harvard Boulevard in Dayton.

Dayton Children's is an anchor institution in the project, along with Mini University, Sinclair Community College and the Omega Com-

munity Development Corporation (CDC). Each partner is dedicated to reducing poverty using a two-generation model that will offer cross-program referrals and success for children and parents simultaneously under one roof. Initial efforts will focus on addressing the three major factors in poverty reduction:

- Developing the workforce
- Improving health
- Growing opportunities through education

Dayton Children's Pediatrics will offer a medical home for children in a region of the city in which half of all children live below the poverty line and unemployment is higher than average. These social determinants are huge impacts on the overall health of children and the families.

"We know that we can only impact 20 percent of a child's health in the doctor's office," says Deborah A. Feldman, president and CEO of Dayton Children's. "By partnering in the Hope

Center for Families and teaming up with the organizations inside, we are able to influence a greater portion of a child's well-being. The support for the whole family provided here is transformational. By joining together to offer these services all in one space, we can truly make an impact in a child and family's health today and for generations to come."

"This project could not be coming to the region at a more crucial time," Vanessa Ward, president of Omega CDC. "Health disparities, especially for the infants, children and youth, will be mitigated with the presence of Dayton Children's Hospital at the Hope Center."

Zenar Yohannes, MD, will lead the program at Hope Center. Two new pediatricians, Stephanie Weber, DO, and Laura Ann Sullivan, MD, will also be based at The Hope Center. The clinic has 10 exam rooms with convenient parking.

# Dayton Children's Hospital receives the 2022 Women's Choice Award® as a Best Children's Hospital



Dayton Children's Hospital is named as a Best Children's Hospital and Best Pediatric Emergency Care by the Women's Choice Award®, America's trusted referral source for the best in health care.

"Our Best Children's Hospitals award raises awareness of the top-quality care

offered for children. The best hospitals embrace families as an integral part of health care and improving children's outcomes," said Delia Passi, CEO and founder of the Women's Choice Award.

The winners represent hospitals that have met the highest standards for children's health care.

"At Dayton Children's, parents and guardians know we treat their children as if they are our own," says Deborah A. Feldman, president and CEO of Dayton Children's Hospital. "We are honored that the Women's Choice Award proves that trust."

## Dayton Children's patient shares story of survival nationally on 20/20

On March 30, 2022, Dayton resident and Dayton Children's patient, Emma Brun, was featured as part of 24 Months That Changed the World, a special edition of 20/20 on ABC. Emma's story was part of the segment focused on the impact of the pandemic on children's mental health.

- The full special can be viewed on Hulu ([https://www.hulu.com/series/bc61b292-470a-47ef-b3f9-39a38f23d-cf3?play=false&utm\\_source=shared\\_link](https://www.hulu.com/series/bc61b292-470a-47ef-b3f9-39a38f23d-cf3?play=false&utm_source=shared_link)). The impact on kids and mental health with Emma's story begins at the 20 minute marker.
- Watch Emma's segment here: <https://youtu.be/I9ZajvB81Bk>

- View the web story featuring both Emma and Dr. John DUBY, vice president of community health at Dayton Children's Hospital here: <https://abcnews.go.com/Health/teen-reflects-recovering-pandemic-related-mental-health-struggles/story?id=83742297>

### Emma's inspiring story of survival

In February 2021, with the added pressures of the COVID-19 pandemic, forced isolation from friends and a loss of identity from not being able to compete or train, Emma ran out of endurance... and hope. She attempted suicide.

A competitive gymnast since she was 9-years-old, Emma Brun, now 18, had been silently

struggling for the last few years with troubling symptoms: black spots in her vision, dizziness and sudden heart rate spikes. She was also plagued with frequent injuries. She never told her parents. Emma had been pushing through these obstacles for so long, it became just part of her routine, and it was taking a toll on her body and her spirit.

After her suicide attempt, Emma's parents took her to their nearest emergency department where they spent the next 24-hours waiting to find an in-state inpatient mental health bed for Emma. Emma spent 10 days in an inpatient mental health unit. The full spectrum of what she had been going through began

to emerge, slowly at first, then as if a great weight was lifting from her shoulders, all the symptoms, all the struggles poured out of her.

Emma's story with Dayton Children's began months later during her recovery period. Her mom, Sybil, saw a comment on Facebook about the Center for the Female Athlete. Feeling it was a perfect fit, she added an appointment with those specialists, too. "It felt like coming full circle," says Sybil. "The Center for the Female Athlete was really the one missing piece in my daughter's care and we realized it once we got answers there."

**To read Emma's full story visit: [childrensdayton.org/patient-stories/emma-brun](https://childrensdayton.org/patient-stories/emma-brun)**

# program evaluation

- The material presented in this publication met the mission to enhance health care delivery in our region through education based on the essentials and policies of the Accreditation Council for Continuing Medical Education.  
 Strongly agree    Agree    Neutral  
 Disagree    Strongly disagree
- Did the material presented in this publication meet the educational objectives stated?  
 Yes    No
- Did the material presented in this publication have a commercial bias?  
 Yes    No
- Please rate the contents of this issue using the following scale:  
 1 = Poor, 2 = Fair, 3 = Good, 4 = Very good, 5 = Excellent (*Circle one response for each.*)
 

	Poor		Excellent		
Timely, up-to-date?	1	2	3	4	5
Practical?	1	2	3	4	5
Relevant to your practice?	1	2	3	4	5
- Please describe any changes you plan to make in your clinical practice based on the information presented in this program.  


---
- Are there any other topics you would like to have addressed in this publication or future educational programs for health care providers?  
 Yes    No   If yes, please describe:  


---
- Please describe how you will incorporate information obtained from this publication into your practice.  


---
- Letter to the editor — Letter to the editor may be emailed to [alters@childrensdayton.org](mailto:alters@childrensdayton.org) or attached to this evaluation and may be published in the next issue.

# program test

## to obtain CME credit you must:

Read and reflect on each article.  
 Answer the questions from each article and complete this test — [cmequiz.childrensdayton.org/PedForumSpring2022](http://cmequiz.childrensdayton.org/PedForumSpring2022). 70 percent correct answers are needed to obtain the full 4.0 AMA PRA Category 1 Credits™.  
 Complete the program evaluation.  
 Return your completed test and program evaluation by email, mail or fax to: Sue Strader, coordinator Department of Continuing Medical Education Dayton Children’s Hospital, One Children’s Plaza, Dayton, Ohio 45404-1815  
 Fax: 937-641-5931  
 E-mail: [straders@childrensdayton.org](mailto:straders@childrensdayton.org)  
 Take test online: [cmequiz.childrensdayton.org/PedForumSpring2022](http://cmequiz.childrensdayton.org/PedForumSpring2022)  
 This test must be received by June 31, 2022 for the credit to be awarded

**pediatric forum** | volume 36, issue 1

## your answers to CME questions

(Please circle the BEST answer.)

- a   b   c
- true   false
- true   false
- true   false
- true   false
- true   false
- true   false
- a   b   c   d
- true   false
- true   false
- true   false
- true   false
- a   b   c   d

## please type or print clearly

name \_\_\_\_\_  
 practice name \_\_\_\_\_  
 street address \_\_\_\_\_  
 city \_\_\_\_\_  
 state/zip code \_\_\_\_\_  
 office telephone \_\_\_\_\_  
 office fax \_\_\_\_\_  
 e-mail \_\_\_\_\_  
 signature \_\_\_\_\_

### physician accreditation statement and credit designation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Wright State University (WSU) and Dayton Children’s Hospital.

WSU designates this Journal-based CME Activity for a maximum of 4 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.



# pediatric forum

Spring 2022

One Children's Plaza  
Dayton, Ohio  
45404-1815  
937-641-3000  
childrensdayton.org

## *Pediatric Forum*

is produced for the professional staff and referring physicians of Dayton Children's by the marketing communications department.

The purpose of Pediatric Forum is to provide information and news about pediatric health care issues and to provide information about clinical services and management issues of Dayton Children's.

## editorial/board

### **Sherman Alter, MD** editor

Lucinda Brown, MSN, RN, CNS  
Kelly Sandberg, MD  
Luzviminda Sinha

### **Sherman Alter, MD**

director, continuing medical education

### **Deborah A. Feldman**

president and chief executive officer

### **Adam G. Mezoff, MD, CPE, AGAF**

vice president for health care transformation, medical affairs  
chief medical officer

### **Matthew Hardwick, MD**

chair of the professional staff

## physician accreditation statement and credit designation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Wright State University (WSU) and Dayton Children's Hospital.

WSU designates this Journal-based CME Activity for a maximum of 4 AMA PRA Category 1 Credit(s)<sup>™</sup>. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

## obtaining CME credit

To obtain CME credit, read, reflect on articles, complete the evaluation and answer at least 70 percent of the quiz correctly. Send the answer sheet and program evaluation to:

### **Sue Strader, coordinator**

department of continuing medical education  
Dayton Children's  
One Children's Plaza  
Dayton, OH 45404-1815  
Fax 937-641-5931  
Email straders@childrensdayton.org

Take quiz online:  
childrensdayton.org/  
providers

The answer sheet and program evaluation must be received by December 31, 2021, for the credit to be awarded.

## sponsorship/accreditation information

### author information

It is the policy of Wright State University to ensure balance, independence, objectivity and scientific rigor in all educational activities.

All authors contributing to our programs are expected to disclose any relationships they may have with commercial companies whose products or services may be mentioned so that participants may evaluate the objectivity of the program. In addition, any discussion of off-label, experimental or investigational use of drugs or devices will be disclosed by the authors. Contributing authors reported the following:

#### **Sean Antosh, MD**

antoshs@childrensdayton.org

Dr. Antosh has nothing to disclose with regard to commercial support.

Dr. Antosh does not plan on discussing unlabeled/ investigational uses of a commercial product.

#### **Arturo Aranda, MD, FACS**

arandaa@childrensdayton.org

Dr. Aranda has nothing to disclose with regard to commercial support.

Dr. Aranda does not plan on discussing unlabeled/ investigational uses of a commercial product.

#### **Elizabeth Mitchell, MD**

mitchelle@childrensdayton.org

Dr. Mitchell has nothing to disclose with regard to commercial support.

Dr. Mitchell does not plan on discussing unlabeled/ investigational uses of a commercial product.

#### **Bridget Jones, PsyD**

jonesb7@childrensdayton.org

Dr. Jones has nothing to disclose with regard to commercial support.

Dr. Jones does not plan on discussing unlabeled/ investigational uses of a commercial product.

#### **Sherman J. Alter, MD**

alters@childrensdayton.org

Dr. Alter has nothing to disclose with regard to commercial support.

Dr. Alter does not plan on discussing unlabeled/ investigational uses of a commercial product.

The content and views presented are those of the author and do not necessarily reflect those of the publisher, Dayton Children's. Unlabeled use of products may be mentioned. Before prescribing any medicine, primary references and full prescribing information should be consulted. All planning committee members have disclosed that they do not have any financial relationships with commercial entities that may impact the content of this publication.

## target audience

This education activity is designed for pediatricians, family physicians and related child health care providers.

## educational objectives

- Identify the four pediatric issues covered in this journal and develop appropriate intervention.
- Appropriately use the resources of Dayton Children's Hospital to improve patient care.



**Dayton Children's Hospital**  
One Children's Plaza  
Dayton, Ohio 45404-1815