

# Cardiac Emergency Response Plan

## Is Your School Prepared?

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*School nurses play a major role in school readiness and emergency management, collaborating in safety assessment of schools and leading efforts to ensure the overall wellness of each child. Sudden cardiac arrest is a growing concern among students, and schools are a place of gathering, not only of our students and educators but also for the community, as family and friends support children in performances, sporting events, and religious or cultural activities. Implementing a school Cardiac Emergency Response Plan (CERP) provides a lifesaving resource for the entire community. This article will review the incidence of sudden cardiac arrest, discuss the latest guidance regarding preventive cardiac screening questions for all children, and share how one school district implemented a CERP using readily available resources.*

**Keywords:** sudden cardiac arrest; cardiac emergency response plan; cardiac emergency response team; pediatric cardiovascular heart screening; change agents; collaborative communication; cardiac emergency response team drills

### Sudden Cardiac Arrest

Football fans across the nation sat in silence on January 3, 2023, watching as 24-year-old Buffalo Bills defensive player

Damar Hamlin collapsed 9 minutes into the game. Damar suffered sudden cardiac arrest (SCA) due to commotio cordis, which is caused by a blunt blow to the chest during a precise moment of the cardiac cycle (Merschel, 2023). Due to the quick response of a robust team of athletic and medical personnel on the field that day, Damar was revived and has celebrated a full recovery. Fortunately, and incredibly, this outcome was repeated in July 2023, when rising basketball player Bronny James collapsed with SCA during a practice at the University of Southern California, where ample support was provided in advance of Emergency Medical Services (EMS) arriving and contributed to his survival (American Heart Association [AHA], 2023). Naturally, public and private K–12 schools do not have the level of available athletic resources as do the National Football League or Division I Universities, yet every youth deserves the same chance for survival.

Recent estimates report more than 356,000 individuals having an out-of-hospital cardiac arrest in the United States every year (Benjamin et al., 2018). Although U.S. data specific to children and youth are lacking, estimates range from 7,000 to 23,000 deaths each year due to an SCA event (Okubo et al., 2020; Parent Heart Watch, 2023), and SCA is reported to be the leading medical cause of death in student athletes (Harmon

et al., 2015). The American College of Cardiology published a study of SCA in U.S. high schools and determined that two in 50 schools can expect an event each year (Sherrid et al., 2017).

Recognizing the need for more accurate data in the United States on the incidence and cause of sudden death in young people, the National Institutes of Health (NIH, 2013) and the Centers for Disease Control and Prevention (CDC) launched a registry (Sudden Death in the Young Case Registry: <https://sdyregistry.org/>). Beginning in 2014, state public health agencies were encouraged to apply to participate in the registry, with the CDC initially accepting up to 15 states or major metropolitan areas. For more information about this registry and to find participating states and areas, see <https://www.cdc.gov/sids/case-registry.htm>. The registry tracks sudden death in the young in addition to sudden unexpected infant death.

### Prevention of SCA Deaths

Many SCA deaths can be prevented through early detection. In 2012 (Drezner et al., 2012), an American Board of Family Medicine study noted that 72% of students who suffered from SCA were reported by their parents to have at least one symptom before the event, though parents did not recognize the symptom(s) as life-threatening. Regular

heart screening has been endorsed by the American Academy of Pediatrics (AAP) and is now part of its Bright Futures Periodicity Schedule for Preventive Pediatric Health Care (Erickson et al., 2021) specifying warning signs and family risk factors that should be addressed by the practitioner with diagnostic follow-up. It is suggested the primary care provider (PCP) use the four screening questions *not* just with student athletes, but with all children a minimum of every 3 years and upon entry into middle or junior high school and high school (see Image 1). Depending on the family's and PCP's concerns, more frequent screening is recommended. Advising parents of observed warning signs to review with their practitioner and connecting them as needed with school-based health care addresses a major public health consideration in SCA prevention. Yet, many SCA victims are not identified in advance of the event, even with screening and additional testing making preparedness for response a priority (Erickson et al., 2021).

### **Is My School Prepared to Respond to an SCA?**

Having a Cardiac Emergency Response Plan (CERP) for your school is crucial to saving lives. Schools that create a CERP and conduct drills have a 70% chance of the event ending in survival (Travers et al., 2015) versus less than 10% for those without (Graham et al., 2015). In evaluating your school's SCA emergency preparedness, several things can lead to a false sense of security. You may have several of your staff certified in cardiopulmonary resuscitation (CPR)/automated external defibrillator (AED). You may have an AED accessible on your athletic fields and additional units strategically placed around your school. You may feel confident that you are prepared for a cardiac emergency on your campus. It is *important to emphasize* that having AED(s) accessible does not ensure the staff or coaches will know how to react in a cardiac emergency. However, a robust CERP engages *all* bystanders to take immediate action; no certification is necessary.

Data from the Cardiac Arrest Registry to Enhance Survival (CARES) report an average of just 40% of SCA victims in the United States receive bystander hands-only CPR and only 11% of victims who arrested in public had a bystander apply an AED (CARES, n.d.). It is clear we are not adequately empowering bystanders to engage. The majority of the public either forgot or were never trained in performing CPR and most feel more confident responding to a natural disaster, fire, or choking victim than they do in using an AED (Sudden Cardiac Arrest Foundation, 2019). It is important to make time to educate our youth. Studies show the following:

- Children as young as 6 and 7 years of age can be taught to seek help for SCA victims by calling 911.
- Children as young as 9 years of age can recognize quality CPR chest compressions.
- Youth aged 11 and 12 years can properly apply an AED within 90 seconds after receiving verbal instructions (Fuchs et al., 2018).

The impetus for our school to implement a CERP with annual drills was simply a heightened awareness of the responsibility to protect the children under our care. We cannot control the fragility of life, but we can control our responses to emergencies with the hope of saving a life.

### **Framework for 21st Century School Nursing Practice**

School nurses are ideally positioned to affect a community's health by advocating for prevention and emergency response standards in the school setting. Creating a Cardiac Emergency Response Team (CERT) with annual practice drills not only is proactive but also pulls from each principle of the Framework for 21st Century School Nursing Practice: Standards of Practice, Leadership, Quality Improvement, Community/Public Health, and Care Coordination (National Association of School Nurses [NASN], 2020). We can encourage and help facilitate a cadre of employees to be

trained in CPR and an AED (i.e., Standards of Practice and Leadership). We can educate the entire staff on signs of cardiac arrest and how to call 911. We can advocate for high school students to be trained in hands-only CPR, and we can provide parents with educational tools via newsletters on the importance of inquiring about a thorough cardiac evaluation at their children's annual checkups (i.e., Care Coordination and Community/Public Health). We can collect data such as the number of staff trained, number of drills conducted, and timing of different components of the drill such as how long it took to retrieve the AED for the purpose of improving processes (i.e., Quality Improvement). Ultimately, our youth may take the knowledge and skills gained from their observations and participation in prevention and response activities to their future workplaces, families, and communities.

### **Becoming an SCA Prepared School**

Several organizations provide resources to assist schools in becoming SCA prepared (see Table 1). Examples of resources and tools provided include prevention training, school checklists, program templates, videos, and information about available grants to assist with purchasing equipment such as AEDs.

Our school participates in Parent Heart Watch's *Get Charged Up!* program for a guide to implementing a CERP. The major components of our implementation program and brief descriptions of each are as follows:

- **Creating a team**—connect with available and willing adults in your school who are CPR/AED certified. This team is responsible for creating, implementing, and evaluating the school's CERP. They are also responsible for orienting the faculty, students, volunteers, and parents to the CERP. Consider inviting physical education teachers, athletic department managers, staff with recess oversight, along with any staff who would be present during, before,

**Image 1.** Flyer Promoting New Heart Screening Guidance for Children and Youth

**NEW SCREENING GUIDELINES**

# All Children Should Be Screened For Potential Heart-Related Issues



New guidance from the American Academy of Pediatrics calls for all youth should be regularly screened for heart issues that put them at risk for sudden cardiac arrest (SCA). Youth should be screened during well-child checks or preparticipation physical evaluations or at least every three years and especially upon entry to middle, junior and high school.

### What Should Be Done To Evaluate a Child's Heart Health

Providers	Parents
<ul style="list-style-type: none"><li>• Know warning signs &amp; risk factors for SCA</li><li>• Conduct thorough personal/family history and physical</li><li>• Order genetic testing if there's a family history of SCA or heart conditions</li><li>• Use electrocardiogram testing for needed follow up and/or refer to a cardiologist</li><li>• Advocate for CPR training and AED placement</li></ul>	<ul style="list-style-type: none"><li>• Know warning signs &amp; risk factors for SCA</li><li>• Regularly ask your children if they've experienced them</li><li>• Be familiar with your extended family's heart history</li><li>• Prepare to answer 4 screening questions</li><li>• Report warning signs and heart history (especially changes) to your provider</li></ul>



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## Screening Questions Practitioners Ask At Each Exam

- 1** Have you ever fainted, passed out or had an unexplained seizure suddenly and without warning, especially during exercise or in response to sudden loud noises such as doorbells, alarm clocks and ringing telephones?
  
- 2** Have you ever had exercise-related chest pain or shortness of breath?
  
- 3** Has anyone in your immediate family (parents, grandparents, siblings) or other more distant relatives (aunts, uncles, cousins) died of heart problems or had an unexpected sudden death before age 50? This would include unexpected drownings, unexplained car accidents in which the relative was driving or sudden infant death syndrome.
  
- 4** Are you related to anyone with hypertrophic cardiomyopathy or hypertrophic obstructive cardiomyopathy, Marfan syndrome, arrhythmogenic right ventricular cardiomyopathy, long QT syndrome, short QT syndrome, Brugada syndrome or catecholaminergic polymorphic ventricular tachycardia, or anyone younger than 50 years with a pacemaker or implantable defibrillator?

Source. Parent Heart Watch. Used with permission.  
Note. SCA = sudden cardiac arrest; CPR = cardiopulmonary resuscitation; AED = automated external defibrillator.

**Table 1.** Available Resources to Assist Schools in Implementing a Cardiac Emergency Response Plan

Organization	Provided resource	URL
American Heart Association	Sample action steps, timeline, developing CERP, practice drills, evaluation materials	<a href="https://cpr.heart.org/en/training-programs/nation-of-heartsavers/cardiac-emergency-response-plan">https://cpr.heart.org/en/training-programs/nation-of-heartsavers/cardiac-emergency-response-plan</a>
Parent Heart Watch	Free SCA prevention training for parents, teachers, coaches	<a href="https://parentheartwatch.org/courses/coach-training/">https://parentheartwatch.org/courses/coach-training/</a>
Project Adam	Heart-safe school checklist and toolkit, program templates and videos	<a href="https://www.projectadam.com/Heartsafeschools">https://www.projectadam.com/Heartsafeschools</a>
Sudden Cardiac Arrest Foundation	Provides grant information for AED funding and for school-based CPR/AED education	<a href="https://www.sca-aware.org/campus/funding-sources-for-schools">https://www.sca-aware.org/campus/funding-sources-for-schools</a>

*Note.* CERP = Cardiac Emergency Response Plan; SCA = sudden cardiac arrest; AED = automated external defibrillator; CPR = cardiopulmonary resuscitation.

or aftercare at your school to be a part of the team. While this team leads the charge, it is important the entire school staff know they have a role in responding to a cardiac emergency (i.e., anyone who witnesses a sudden collapse should activate the local 911 service and initiate hands-only CPR to an unresponsive individual who is not breathing until a CPR-certified individual arrives at the scene and is able to take over.)

- **Document a plan**—ready-to-use templates help you create a CERP for your school. If you already have an emergency response plan, you can add specific SCA details to your plan. The CERP assigns unique roles to the team members in addition to CPR/AED provider, such as calling 911, recording time and events, alerting the staff and students that an emergency is occurring in the building, meeting and directing EMS when they arrive on the scene, notifying the district office, communicating to the larger school community, maintaining and replacing equipment, and debriefing after an event (Parent Heart Watch, n.d.). Share your draft plan with your administration, the district’s legal team, and with the local EMS for review. You will need to evaluate your plan annually at the beginning of each school year.

- **Properly place and install AEDs**—when considering AED placement, the best practice is to have an AED available within 3 minutes from any location on your school campus. Every minute that passes prior to the arrival and use of the AED decreases the survival rate by 10% (AHA, 2018). Thus, large campuses likely need more than one AED. No matter the number of devices, placing them in common areas such as the main office, cafeteria, gymnasium, or public hallway outside the auditorium (never behind locked doors) is key to achieving a quick response. Use three-dimensional wall signage to ensure the device is visible from multiple directions. AED alarm cabinets, that sound whenever the door is opened, help to alert the school staff to an emergency. Not advised are placement of stickers on the AED or cabinet stating “trained responders only” as bystanders could be discouraged from quickly retrieving the AED. Stickers such as these are out-of-date and no longer useful to the current cardiac chain of survival which seeks to engage those who witness an SCA to take immediate action regardless of their certification status.
- **Practice drills annually**—a fully functioning CERP necessitates annual drills. Parent Heart Watch provides both a template practice drill check off sheet and a drill evaluation sheet. Consider inviting your local EMS to

come to the drill as well as athletic directors, sporting team site managers, and aftercare staff.

- If you are conducting your drill during the school day, take the time to reach out to teachers beforehand and provide them with some guidance. Suggest teachers explain to the students what a cardiac drill might look like (e.g., show a picture of a manikin to the class and inform the students that they may notice a manikin placed in the hallway for the cardiac drill). Request teachers show the kids where the school’s AEDs are located. Provide an age-appropriate explanation of “an AED; for example, for elementary students, consider beating normally again.” The more we capitalize on opportunities to educate our students, the more we are creating a culture of prevention that empowers our children and our community to take action during a cardiac emergency.

An AED is a medical machine that can check someone’s heart beat. The AED can read if the heart is beating normally. It can also read if the heart is beating in an unusual way or in a way that is causing harm and if so, can help restart the heart so that it is beating normally again.

- Make sure and take time after the drill for the team and any of the witnesses you invited (e.g., EMS) to discuss areas of strengths and weaknesses witnessed during the drill. After our building's first drill, every team member identified areas of improvement resulting in a reevaluation of our plan.

- **Communicate to your school community**—each year, after updating the school's CERP, make sure to distribute the plan to the entire school staff. Be sure the front office and those in charge of emergency drills have a list of phone numbers for your team members and their location. Present the plan at back-to-school meetings and assemblies. Provide an overview of your school's cardiac emergency response plan in newsletters, emails, letters, and on your school website. Communicate annually with athletic directors, sports commissioners, coaches, and anyone overseeing a large gathering during after-school hours. Share resources with parents for the latest, recommended cardiac risk assessment and encourage parents to complete the questions about warning signs and risk factors with their child annually, as well as requesting a full youth cardiac evaluation annually with their child's primary healthcare provider regardless of participation in sports as discussed earlier in this article.

### Prioritize a Culture of Preparedness

The AAP reminds us that on any given day, as many as 20% of the combined U.S. adult and child population are present in schools, and caring for this percentage of the population necessitates having a CERP (Erickson et al., 2021). As emphasized in this article, the AAP lists essential elements of the CERP which include effective communication systems, availability of trained CPR/AED responders, access to an AED and other necessary emergency equipment, coordination between the on-site responders and the local EMS, and practice of the response plan through

conducting of drills. The AAP also provides measurable goals such as a collapse-to-EMS call time of less than 1 minute, a collapse-to-first shock time of less than 3 minutes when an AED is on-site, at least 10% of staff and 50% of physical education staff being current in CPR/AED certification, and conducting at least two successful drills every school year (AHA, n.d.; Erickson et al., 2021).

As highlighted by the Whole School, Whole Community, Whole Child model, schools play a critical role in promoting the health and safety of young people and helping them establish lifelong healthy behaviors (CDC, 2023). Prioritizing a culture of preparedness will help influence the next generation of life savers to be empowered to prevent the needless loss of life and could change the impact of SCA prevention in their lifetime. School nurses are protectors, leaders, and innovators. Parents place their children in our trusted hands to keep them safe. Awareness is an important part of change, but becoming knowledgeable does not necessarily create action. Action requires effort, and given the multitude of resources available, every school can achieve this important goal of being a CERP-prepared school. ■

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Maureen has been part of the national movement to eliminate preventable deaths and disabilities from sudden cardiac arrest in youth since 2012 through the implementation of free outreach and awareness programs like Get Charged Up! and Take the Prevention Promise.