Sudden Cardiac Arrest in Schools: Planning and Management for School Nurses

MICHIGAN SCHOOL NURSE GUIDELINES AND RESOURCES

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Foreword

These guidelines contain recommendations for current best practices for the health service topic addressed. They have been reviewed by the School Nurse Practice Subcommittee of the Michigan Statewide School Nurse Task Force as a means to provide consistent and safe care to the students. Specific laws and regulations that direct school nursing practice or other health services are identified in the guidelines. There is no guarantee that the use of guidance in this document will lead to any particular result or outcome. The information in this document was researched in April, 2016.

Purpose

This document will provide guidelines and resources for planning and managing sudden cardiac arrest emergencies in the school setting.

Overview

School nurses need to be prepared to respond to any school emergency that can include unintentional injuries, natural disasters, violence, and complications resulting from chronic illnesses such as asthma, diabetes, life-threatening allergies and epilepsy. Sudden cardiac arrest (SCA) is a condition in which the heart suddenly and unexpectedly stops beating. If this happens, blood stops flowing to the brain and other vital organs. SCA usually causes death if it’s not treated within minutes (National Heart, Lung, and Blood Institute [NHBLI], 2015). In Michigan, approximately 300 people aged 1-39 years die suddenly of a cardiac cause (Centers for Disease Control and Prevention [CDC], 2015).

Sudden cardiac arrest in young people is an emergency that is usually caused by an undetected heart abnormality, such as Long QT Syndrome, Wolff-Parkinson White Syndrome, cardiomyopathy, or commotion cordis caused by a sudden blow to the chest (Evans & Ficca, 2012). Lofti et al. (2007) found that in a school setting most cardiac arrests are witnessed and exhibit ventricular fibrillation indicating the significance of early defibrillation and the need for an AED. Many cardiac arrests are precipitated by lethal heart arrhythmias that can only be reversed by the delivery of shock to the victim’s chest with a defibrillator (American Heart Association [AHA], 2011). The likelihood of a sudden cardiac arrest in a child or young adult with underlying cardiovascular disease is increased by athletic participation (American Academy of Pediatrics [AAP], 2012; Subasic, 2010). Underlying cardiac disorders associated with pediatric and young adult SCA care considered structural-functional, electrical or other (use of stimulants, some prescription medications). In most cases, the immediate cause of SCA is lethal ventricular tachyarrhythmia (AAP, 2012).

Legal Framework for Managing Sudden Cardiac Arrest Emergencies in Schools

Federal Law

There are no federal laws requiring school districts to have emergency management plans but an estimated 95% of school districts across the country reported they have a plan (AAP, 2008a).

### Revised Bloodborne Pathogen Standard

**CPL 2-2.69 (November 27, 2001)**

Revised Bloodborne Pathogens Standard; expands bloodborne pathogens to include any pathogenic microorganism, including hepatitis C virus (HCV) present in blood or other potentially infectious materials (OPIM).

### Americans with Disabilities Act of 1990 (ADA)

Disability discrimination prohibited.

### Title VI of the Civil Rights Act of 1964

Emergency plans must comply with legal requirements for language access.

### Michigan Law

Michigan law requires schools to adopt and implement a cardiac emergency response plan, have a trained first aid person on site, and conduct emergency drills.

**Education; safety; reporting requirement for public school safety drills; provide for, and require cardiac emergency response plan.**

**PA 12 of 2014**

The governing body of a school that operates K-12 shall adopt and implement a cardiac emergency response plan for the school. The plan must include at least: 1) Use and regular maintenance of the auto external defibrillator, 2) Activation of a cardiac emergency response team during an identified cardiac emergency, 3) A plan for effective communication, and 4) If a school is grades 9-12 a training plan for use of an auto external defibrillator in CPR rescue techniques.

In addition, Public Act 12 requires any Michigan school that operates any of grades Kindergarten to 12 to conduct at least:

- Five fire drills per school year. Three of which must take place by December 1. (There must be a reasonable interval between each drill.)
- Two tornado safety drills per school year. One of which must take place in March.
- Three lockdown drills per school year, including security measures appropriate to an emergency "such as the release of hazardous material or the presence of a potentially dangerous individual on or near the premises." At least one of the drills must take place by December 1 and at least one after January 1. (There must be a reasonable interval between each drill.)
The National Association of School Nurses (NASN) believes the school nurse provides leadership in all phases of emergency preparedness and response and are a vital part of the school team responsible for developing or re-designing emergency response procedures for the school setting using an all-hazards approach (NASN, 2014; Flaherty, 2013; Galemore, 2012; Hull, 2012). NASN (2014) defined the emergencies school nurses must be prepared to respond:

- Health related emergencies related to injury or illness.
- Large numbers of individuals in casualty incidents.
- Weather related emergencies.
- Hazards such as explosions and fires.

The complex role of the school nurse in crisis response is multidimensional, encompassing both short-term and long-term responsibilities and requiring considerable knowledge in emergency management and care, risk assessment, crisis reaction and intervention, and community outreach (Rains & Robinson, 2012). School nurses prepare individualized health plans and emergency care plans for students known to be at risk for an emergency at school (Evans & Ficca, 2012; O’Brien, Evangelista, Green & Uzark, 2012; O’Brien, Evangelista, Green & Uzark, 2013; Rains & Robinson, 2012). As advocates for children’s health needs, school nurses communicate with the health care team, school personnel and families (O’Brien et al., 2013).

**Recommendations for Practice**

**Surveillance**

There are multiple levels of surveillance needed to for providing safe school environments for all students and staff. The Michigan Department of Health and Human Services (MDHHS) Genomics Program (2016a) initiated a surveillance system to further assess the impact of Sudden Cardiac Death of the Young (SCDY). Additional data sources can be found at: [http://www.michigan.gov/mdhhs/0,5885,7-339-73971_4911_4916_47257-241907--,00.html](http://www.michigan.gov/mdhhs/0,5885,7-339-73971_4911_4916_47257-241907--,00.html)

School setting assessment for an AED includes:

- Identifying students or adults with a cardiac condition or critical medical condition.
- Determining the distance of the school from EMS providers.
- Determining how the building is used after hours (Evans & Ficca, 2012).
Student athlete screening:

- School nurses need to assess current policies and procedures of pre-participation sports physicals and school compliance with guidelines (Subasic, 2010).
- Pre-participation sports screenings of student athletes can detect high risk conditions that predispose to sudden cardiac death in youth (AAP, 2012; MDHHS MI Genetics Resource Center, 2016b; Bultas, 2012; Subasic, 2010).
- C.S. Mott Children’s Hospital Congenital Heart Center (2016) recommends that parents partner with pediatricians and use the Michigan High School Athletic Association questionnaire to evaluate their child to determine their need for a more detailed cardiac evaluation. The physical examination clearance form can be retrieved at [http://www.mhsaa.com/Portals/0/Documents/AD%20Forms/physical%202011.pdf?ver=2012-01-06-151935-937](http://www.mhsaa.com/Portals/0/Documents/AD%20Forms/physical%202011.pdf?ver=2012-01-06-151935-937)

Outreach

Collaborate with school officials, medical staff, EMS agencies, and families to establish comprehensive emergency response plans and AED programs (Evans & Ficca, 2012).

Population Care

School nurses need to advocate for improvement in existing school preparedness programs and ensure compliance with school policies and evidence-based guidelines. Evans and Ficca (2012) recommend the AED plan be incorporated in the school’s emergency response plan. Specific components of the emergency response plan need to include:

- Identification of who is responsible for the emergency care plan.
- A communication plan linking all parts of the school grounds.
- Equipment.
- Identification of who retrieves the AED and placement of the AEDs.
- Description of who initiates the EMS and local emergency care facility(s).
- Specification of who directs EMS to the scene.
- Identification of who is to be trained in CPR.
- Specification of who contacts the administration and parent/guardian.
- Specification of which, if any school personnel should accompany the student to the local emergency room.
- Description of documentation procedures.
- Practice drills (Anderson, Clarke, Hester, & Mann, 2011; Evans & Ficca, 2012; Rains and Robinson, 2012; O’Brien et al., 2012).

A sample cardiac emergency response plan template and protocol developed by the MDHHS MI Genetics Resource Center (n.d) can be retrieved from [https://migrc.org/Library/HeartSafeActionPlan.html](https://migrc.org/Library/HeartSafeActionPlan.html). The sample templates may be modified for use at individual schools and should be reviewed by the appropriate legal counsel for the school.
School nurses can work with families to help ensure the safety of their children during the school day by sharing the school’s emergency plan and asking them to:

- Provide information about any unique needs their children may have and completing and emergency information form.
- Arranging for the school to have back up/extra medication on hand to address the unique needs of their child.
- Provide the school and their child’s teacher with up-to-date contact information for family or friends who can help out if they are unavailable (AAP healthychildren.org, 2015a).

Currently, there are no Michigan laws mandating CPR training to graduate from high school although 30 states have passed laws or adopted curriculum changes to require hands-on guidelines-based CPR to graduate (AHA, 2016a).

Michigan’s MI HEARTSsafe School’s Award Program was developed to help schools be prepared for a cardiac emergency. Schools meeting the minimum criteria will be awarded the MI HEARTSsafe school designation, receive a letter of commendation, and be spotlighted on their website (MDHHS, 2016c). Information about the MI HEARTSsafe Program can be retrieved at https://migrc.org/Library/HEARTSsafe.html.

Levels of Prevention

Primary Prevention and Preparedness

1. Collaborate with school officials to develop a school-preparedness program that includes education and all-staff awareness, knowledge and application of effective bystander techniques, implementation of lay rescuer AED program, written emergency plans, effective communication throughout the school campus, and periodic practice drills (AAP, 2012; Evans & Ficca, 2012).

2. Collaborate with school officials to consider providing a CPR training program that includes AED skills practice to secondary students (AHA, 2011). The AHA provides “be the beat” website for school administrators and teacher to help start and sustain CPR and AED programs in schools. Information can be retrieved at http://bethebeat.heart.org/.

3. Educate families, students, school boards, and administration of the risk of sudden cardiac death in high school athletes (Subasic, 2010).

4. Individualized Health Care Plans and Emergency Care Plans need to include when to call 911 for all children (O’Brien et al., 2012).

5. When an AED is not on site, the school nurse needs to advocate for the acquisition of an AED and an AED policy (Evans & Ficca, 2012).

6. Collaborate with local EMS to be sure they are aware of the type of rescue equipment available at school and the location of the equipment (Evans & Ficca, 2012).

7. “Need to know” school staff should be aware of students that may be at risk for developing life-threatening situations (Evans & Ficca, 2012). School nurses and athletic trainers should determine a
8. Ensure the AED plan involves policies and procedures for AED use, such as, daily accountability for the AED program, maintaining AED equipment and accessories, and documenting AED maintenance procedures (Anderson et al., 2011; Evans & Ficca, 2012).

Secondary Prevention/Response

In 2014, Governor Snyder sent a letter with school emergency planning documents that can be found at http://www.michigan.gov/documents/msp/executive_letter_08182014_2_475755_7.pdf to all Michigan schools, local emergency managers, and law enforcement agencies about collaborating to develop an Emergency Operations Plan (EOP). Planning guidance, an EOP template and a Classroom/Office Quick Reference Guide were included in a DVD. The documents were not publicly posted on the Michigan State Police webpages in order to protect the security and safety of schools. To obtain copies of the actual toolkit school nurses will need to contact the Michigan State Police at the following email address: msp-schoollasafe@michigan.gov; or they may contact their local emergency manager, or local law enforcement agency.

Schools can best respond to emergencies by following the guidance sent from Governor Snyder’s Office. Specific school nurse responses may include:

- Triage, direct physical and mental health care for all victims of an emergency, including linking them to medical and public health resources (NASN, 2014).
- Communicate school entry points to EMS responders and ensure there is a designated greeter (AAP Council on School Health, 2008b).
- Facilitating or co-facilitating an evacuation (NASN, 2014).
- Reuniting families after a crisis (NASN, 2014).
- Documentation that includes description of illness and injury and disposition as well as the sequence of events (AAP Council on School Health, 2008b).

Tertiary Prevention/Recovery

School nurses can assist students, parents, and school staff by providing direct support and link community resources to those in need (NASN, 2014). Specifically, school nurses can:

- Identify and monitor students and staff who are likely to need additional services and resources during renormalization (AAP Council on School Health, 2008a; Flaherty, 2013).
  - Children should be informed about the disaster or crisis as soon as information becomes available starting with simple and basic facts (Schonfeld & Demaria, 2015).
  - The National Child Traumatic Stress Network (n.d.) provides a child trauma toolkit for teachers that can be retrieved at http://www.nctsn.org/resources/audiences/school-personnel/trauma-toolkit
- Collaborate with the crisis response team conduct debriefing sessions and develop recommendations to improve plans (Flaherty, 2013; NASN, 2014).
- Collaboratively with the crisis team complete reports and documentation (NASN, 2014).
- Re-stock medications and equipment (AAP Council on School Health, 2008b).
- Collaborate with the crisis team to plan for anniversaries, as they are an important part of prolonged recovery (AAP Council on School Health, 2008a).
• Provide anticipatory guidance to parents on how to identify the most common adjustment reactions, such as, sleep disturbances, difficulty with concentration, eating problems, anxieties, substance abuse, risk taking behaviors, developmental regression (AAP Disaster Preparedness Advisory Council & Committee on Pediatric Emergency Medicine, 2015).

Social Determinants of Health and Health Equity

Education, literacy, social support networks, neighborhood safety, access to health services and culture impact health (NASN, 2016). School nurses can advocate for all students when considering the social determinants of health in emergency planning. All phases of emergency operations need to include plans for communicating with non-English speaking students and parents (AAP Council on School Health, 2008a; Flaherty, 2013).

Red Flags for Managing Cardiac Emergencies in the School Setting

1. Symptoms such as dizziness, chest pain, syncope, palpitations or dyspnea may be common before sudden cardiac arrest (SCA) in patients with structural-functional or electrical disorders. In 8% to 33% of cases, deaths from SCA were exertion-related (AAP, 2012).

2. Young athletes may be at greater risk and need further evaluation and tests if there is:
   • A history of chest pain, dizziness, fainting, or abnormal shortness of breath or fatigue during exercise.
   • Unexpected sudden death of a family member at a young age. (This could mean there is a possibility of inherited heart disease).
   • A history of abnormal heartbeat or heart murmur (most murmurs are harmless).
   • Heart and/or eye problems experienced by an athlete who is unusually tall, especially if being tall is not common in other family members (AAP healthychildren.org, 2015b).

3. Prodromal symptoms (chest pain, fatigue, syncope, indigestion or heartburn, excessive shortness of breath, ear or neck pain, upper respiratory infection, palpitations, severe headache) are warning signs that precede cardiac death and have been documented to occur in approximately 36% of sudden cardiac deaths (Subasic, 2010).

4. The sooner an AED is used on a cardiac arrest victim, the higher the probability of survival. Immediate response is essential for a successful outcome. Less than one minute from the moment the victim collapses to the time “911” is called is required to assure successful resuscitation (Evans & Ficca, 2012).

5. The highest risk of cardiac arrest is in schools, with largest numbers high school students who are athletes. Consideration of the proximity to police and fire stations that dispatch EMS need to be evaluated for the AED program, as well as the use of the building for community and after school
programs. If a student’s diagnosis warrants an AED in school, it is recommended that the student have a personal defibrillator as designated by a Section 504 plan or IHP (Evans & Ficca, 2012).

6. The American Heart Association cautions that screening only athletes raises ethical questions, as there are young people who don’t participate in sports who die from cardiac arrest (AHA News, 2016b).

7. Electrocardiography (EKGs) and echocardiography (echos) are not recommended as part of regular screening of athletes. This is because a heart problem is found very rarely (AAP healthychildren.org, 2015b).

8. With few exceptions, children with congenital heart disease are able to fully participate in all school activities (O’Brien et al., 2012). Despite physiological deficits, nearly all children with heart disease can participate in some sort of exercise program or sport (O’Brien et al., 2013; AAP healthychildren.org, 2015b). It is the main responsibility of health care providers to evaluate each individual heart problem and set individual limits of physical activity with appropriate consultation with a cardiologist (AAP healthychildren.org, 2015b).

8. Congenital heart defects account for only 2% of sudden cardiac deaths in children (O’Brien et al., 2013).

References


Michigan Department of Health and Human Services MI Genetics Resource Center (2016c). *Sudden cardiac arrest in the young*. Retrieved from [https://migrc.org/Providers/SuddenCardiacDeath.aspx](https://migrc.org/Providers/SuddenCardiacDeath.aspx)


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