APRIL 18, 2024

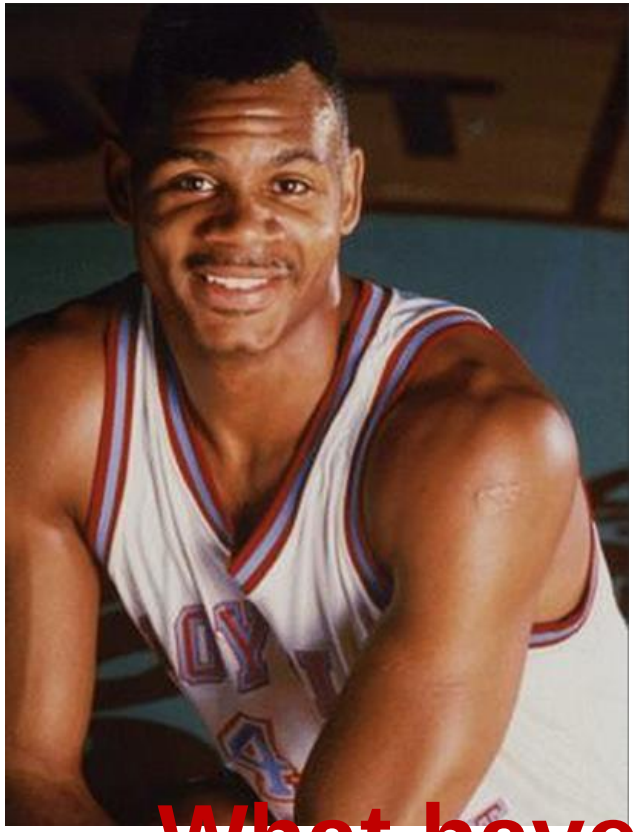
Do CPR and AEDs make a difference?

Discussion of sudden cardiac arrest and how to respond in an emergency

Children's Hospital Colorado
Here, it's different.™

Today's Objectives:

1. Identify sudden cardiac arrest
2. Discuss the importance of a comprehensive cardiac emergency plan
3. The role of Project ADAM



Hank Gathers - 1989

Damar Hamlin - 2023

What have we learned and where do we go from here?

Cardiac Arrest in the U.S.

Each year, out-of-hospital cardiac arrests strike more than 350,000 people across the United States and affects seemingly healthy individuals of all ages, races, genders, often without warning.

Using conservative estimates, cardiac arrest is the third leading cause of death in the United States, following cancer and heart diseases.

CARES Registry

The Cardiac Arrest Registry to Enhance Survival

Without a reliable method of data collection, communities can't measure the effectiveness of their response systems. CARES was developed to help communities determine standard outcome measures for out-of-hospital cardiac arrest (OHCA) while allowing for quality improvement efforts and benchmarking capability to improve care and increase survival.

Colorado CARES Data

Table 4. Public Reporting of State Aggregate Metrics, 2022									
	OHCA Incidence					Non-Traumatic Etiology Survival Rates		Bystander Intervention Rates	
	CARES Cases Reported	CARES Population Catchment	Total State Population	% Population Covered	Incidence Rate (per 100,000)	Overall Survival to Hospital Discharge (%)	Utstein Survival (%)	CPR (%)	Public AED Use (%)
National	**147,736**	**166,391,259**	**331,893,745**	**50.1%**	**88.8**	**9.3**	**30.7**	**40.0**	**11.3**
State									
Alaska	542	608,301	732,673	83.0%	89.1	12.7	42.5	73.2	18.8
California	26,403	32,866,592	39,237,836	83.8%	80.3	7.8	28.6	41.0	9.6
Colorado	3,711	4,581,690	5,812,069	78.8%	81.0	11.6	35.2	38.8	13.9
Connecticut	2,480	2,656,834	3,605,597	73.7%	93.3	9.5	34.0	22.8	6.0
Delaware	1,317	1,003,384	1,003,384	100.0%	131.3	10.6	41.5	37.0	9.0
Hawaii	1,693	1,441,553	1,441,553	100.0%	117.4	10.9	38.2	37.4	10.4
Maine	1,363	1,372,247	1,372,247	100.0%	99.3	7.6	20.1	52.2	14.6
Michigan	9,275	8,775,764	10,050,811	87.3%	105.7	8.1	25.2	35.6	9.1
Minnesota	3,293	4,701,076	5,707,390	82.4%	70.1	10.1	33.3	37.9	11.4

Criteria for reporting: at least 50% population catchment in state; voluntarily reporting data
Utstein: Witnessed by bystander and found in shockable rhythm.
Bystander CPR rate excludes 911 Responder Witnessed, Nursing Home, and Healthcare Facility arrests.
Public AED Use rate excludes 911 Responder Witnessed, Home/Residence, Nursing Home, and Healthcare Facility arrests.

State-Level Implementation of Health and Safety Policies to Prevent Sudden Death and Catastrophic Injuries Within Secondary School Athletics: Orthop J of Sports Medicine (2017)

Sudden death and catastrophic injuries during sport can be attenuated with the implementation of evidence-based health and safety practices.

A rubric for evidence-based practices for preventing the leading causes of death and catastrophic injuries in sport was created. The equally weighted sections included:

1. sudden cardiac arrest
2. head injuries
3. exertional heat stroke
4. appropriate medical coverage and emergency preparedness.

Where did Colorado land in the rankings?

DEAD LAST!

Out-of-Hospital Cardiac Arrest (OHCA)

Bystanders can provide basic life support treatments, by activating EMS, administering CPR and applying defibrillation with an AED.

Bystander-administered CPR is associated with substantial increases in survival rates and with better neurologic outcomes following cardiac arrest.

46%

Percent of cardiac arrests witnessed by another individual

<3%

Percent of the U.S. population receive CPR training annually

11%

Percent of people who experience OHCA survive to hospital discharge nationally

Each minute without CPR/AED treatment decreases the likelihood of survival with good neurologic outcomes. Decreasing the amount of time between cardiac arrest onset and the first chest compressions is critical.

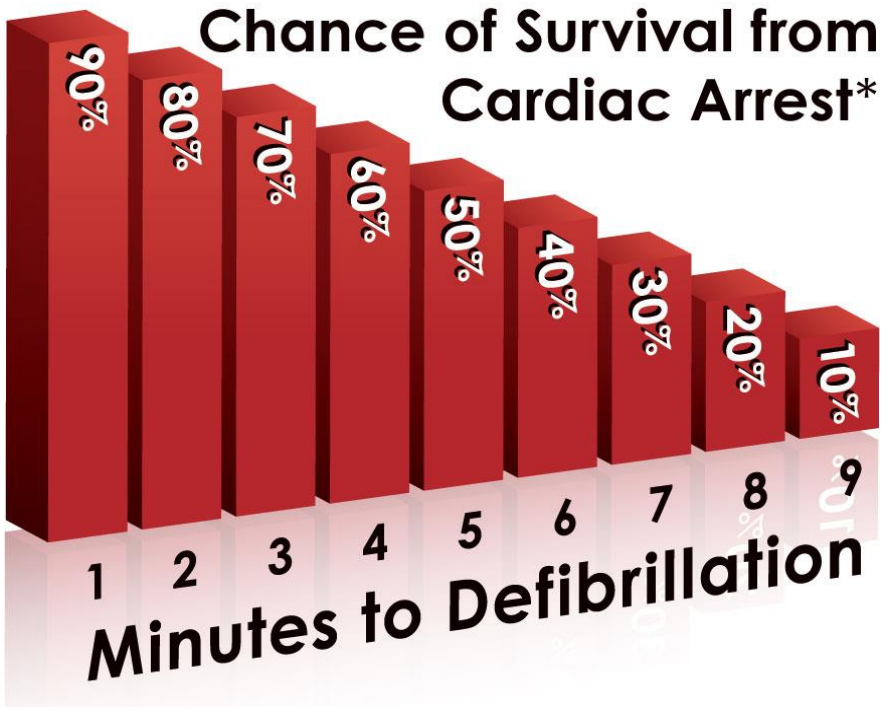


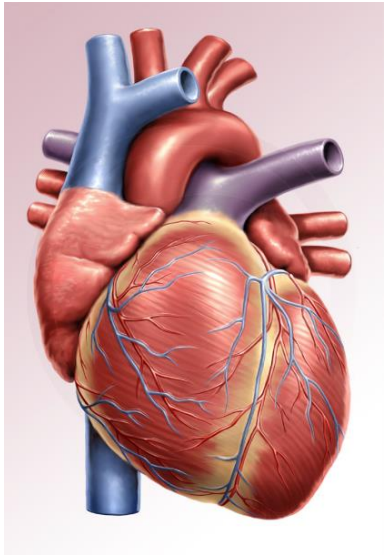
Image is from Arizona Heart Rhythm Center: http://azheartrhythmcenter.com/patient-education/what-is-sudden-cardiac-arrest/

Even with access to an AED, a comprehensive emergency action plan and enough staff members trained in CPR…***nothing happens if you do not recognize sudden cardiac arrest***.

Recognition of sudden cardiac arrest

1. Almost instantaneous loss of consciousness and collapse
2. Absent or agonal breathing
3. Seizure like activity
4. Eyes open and/or rolled back

Know the difference between Heart Attack and Cardiac Arrest



Heart Attack

A heart attack happens when a coronary artery becomes blocked. This stops blood flow to one part of the heart. But the heart continues to beat.

Early Warning Signs

An individual may have chest pain, fatigue, weakness, nausea, or shortness of breath.

VS

Cardiac Arrest

Cardiac arrest occurs when the heart beats fast and wildly or stops beating altogether. This can be caused by a heart attack or a malfunction in the heart's electrical system.

Early Warning Signs

Usually there are no early warning signs before the individual collapses. Some people may experience palpitations, dizziness, chest pain momentarily before they lose consciousness and collapse.

Witnessed collapse

RECOGNITION

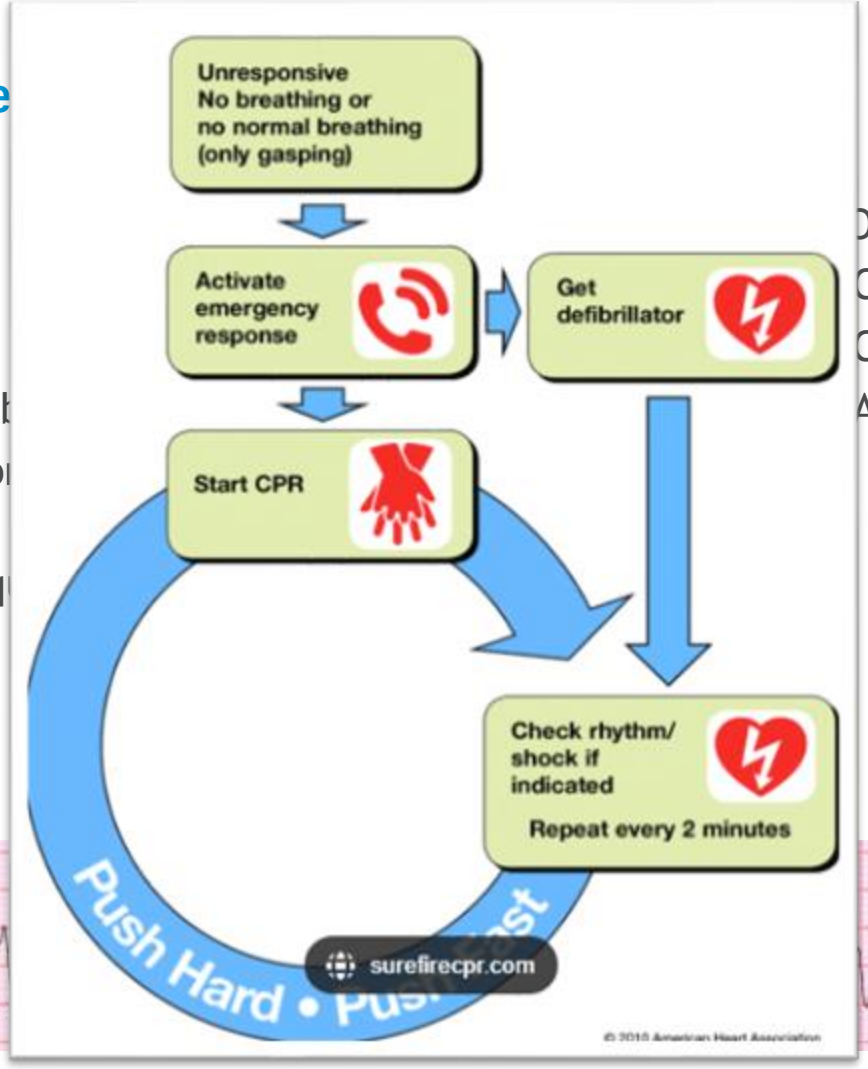
- Sudden collapse
- Unresponsive
- Eyes open/rolled b
- Gasping/respirato movements
- Seizure/shaking/q

ONSE

Call for help

Chest compressions

Apply AED



How to recognize sudden cardiac arrest on the pitch

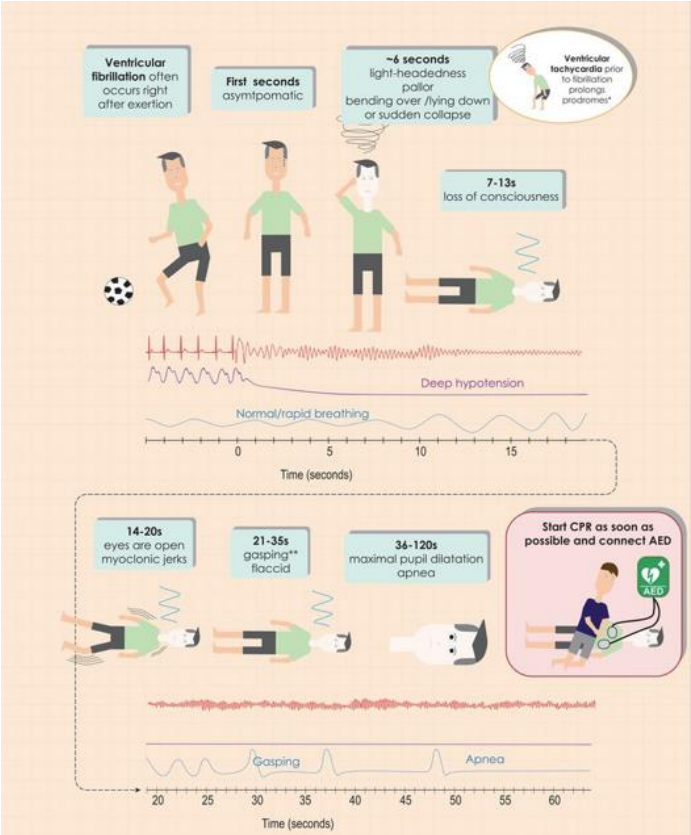
Jelle de Jong, Harald T Jorstad, Roland D Thijs, Ruud W Koster, Wouter Wieling

British Journal of Sports Medicine, 2019

Sudden cardiac arrest (SCA), which occurs at a rate of about 1 in ~50 000 athlete years, is the most common cause of death in exercising young athletes.

1. SCA is most frequently caused by lethal cardiac arrhythmias—that is, ventricular fibrillation (VF). If clinicians recognize key features of SCA early and accurately, they can immediately begin cardiopulmonary resuscitation (CPR) and use an automated external defibrillator (AED) as needed.

2. This review aims to (1) assist health professionals recognize the signs (and avoid common pitfalls) of SCA and (2) emphasize best practice responder strategies for SCA on the pitch.



*The transition of ventricular tachycardia to ventricular fibrillation is highly variable. Hemodynamically stable ventricular tachycardia can result in variations in duration of prodromal symptoms. **The duration and frequency of gasping is highly variable.

References
Wieling W, Thijs RD, van Dijk N, et al. Symptoms and signs of syncope: a review of the link between physiology and clinical clues. Brain 2009;132:2630-42. doi: 10.1093/brain/awp179
Zuercher M, Ewy GA, Hilwig RW, et al. Continued breathing followed by gasping or apnea in a swine model of ventricular fibrillation cardiac arrest. BMC Cardiovasc Disord. 2010;10:36. doi:10.1186/1471-2261-10-36
Perkins GD, Handley AJ, Koster RW, et al. European Resuscitation Council Guidelines for Resuscitation 2015: Section 2. Adult basic life support and automated external defibrillation. Resuscitation 2015;95:81-99. doi: 10.1016/j.resuscitation.2015.07.015

EMERGENCY ACTION PLAN IN THE EVENT OF SCA

Emergency Action Plan for Sudden Cardiac Arrest

Non-traumatic collapse AND unresponsive

Assume SCA

DISTRACTORS:
Continued respirations/gasping
Seizure-like activity
Eyes open/rolled back
Falsely assuming a pulse

Call EMS

Begin Hands-only CPR (chest compressions)

Retrieve and apply AED as soon as possible

Components of a Comprehensive Cardiac Emergency Preparedness Program

1. Access to AEDs
2. Cardiac Emergency Response Team
3. Cardiac Emergency Response Plan
4. CPR/AED Training
5. Cardiac Emergency Response Drills

Automated External Defibrillators (AEDs)

1. The placement of the AED(s) makes it accessible from any part of the building or campus within 2-3 minutes.
2. AED(s) have clear signage.
3. The AED(s) is checked for performance readiness at least monthly and documented each time.
4. A first responder kit is near or attached to the AED which includes: CPR barrier device, scissors, gloves, razor and towel.

Cardiac Emergency Response Team

1. A CPR-AED site coordinator is identified, who oversees the CPR-AED program activities and training.

2. There is a designated cardiac emergency response team comprised of at least 10% of staff or 5-10 people.

Cardiac Emergency Response Plan

1. We have a written cardiac emergency response plan that is reviewed annually.
2. We have a cardiac emergency communication code to notify responders and others in the area that an incident is occurring.
3. Local emergency medical services have been notified of our CPR-AED program.
4. Our school's written CERP, including location of AED(s), has been shared with extracurricular activities, community groups who utilize school campus.

Training/Education

1. CPR-AED training for the emergency response team is updated annually and there is a system in place to track retraining.
2. All faculty and staff know where the AED(s) are located and how to access them.
3. All faculty and staff have annual awareness training on SCA and review the school's CERP.

Cardiac Emergency Response Drills

We conduct at least one annual cardiac emergency response drill to test our emergency plan and communication. A drill summary checklist is utilized for planning purposed and post-drill review.

I have a pacemaker/ICD. Can I still get CPR or have an AED applied to my chest?

ABSOLUTELY!!! Just because a student has a pacemaker or ICD, they should be treated like every other student in an emergency.

CPR will not damage the internal device.

The AED should still be applied to the torso and will evaluate the student's rhythm prior to delivering a shock.

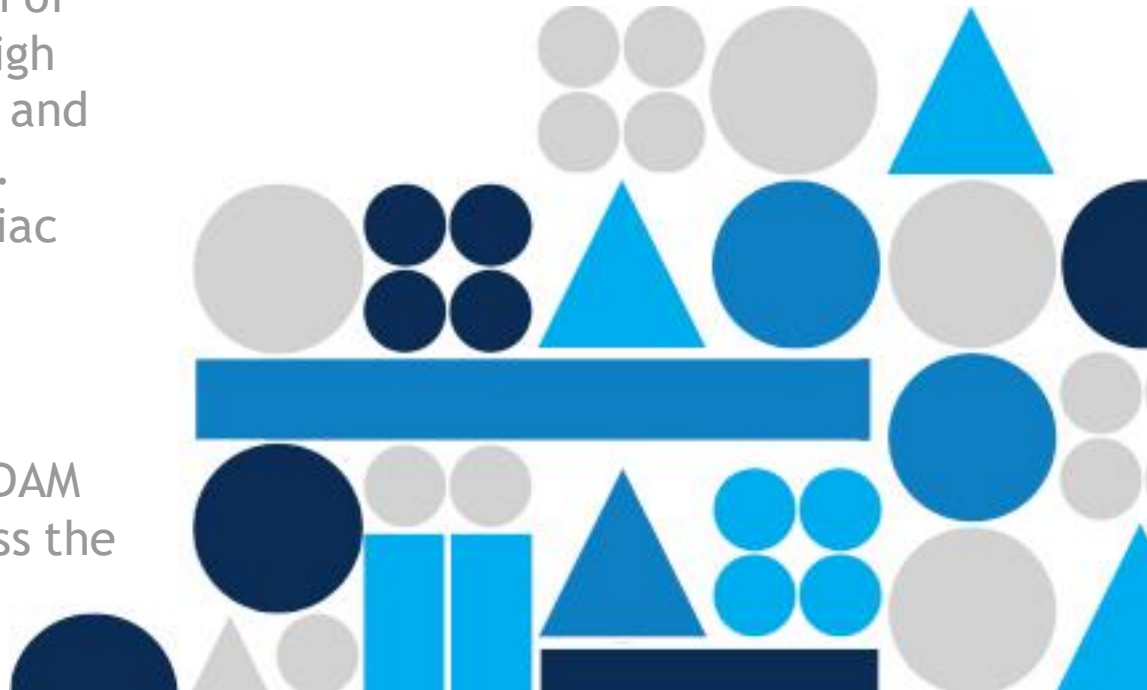
Project ADAM®

SAVES LIVES

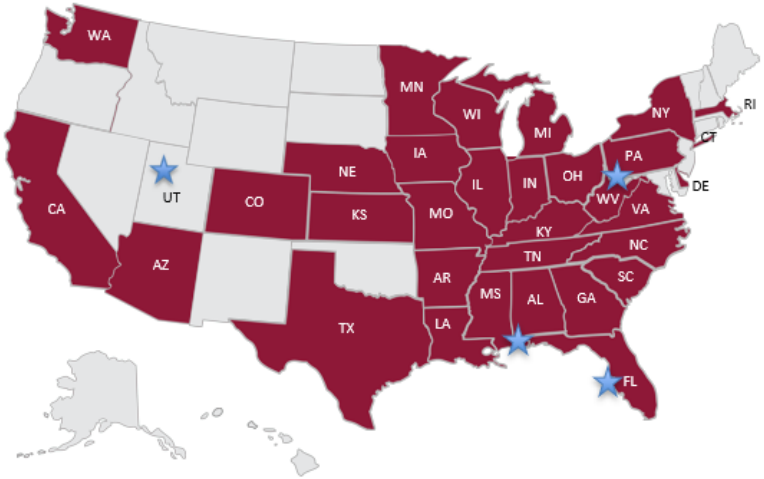
Project ADAM

Project ADAM (Automated Defibrillators in Adam's Memory) began in 1999 after the death of Adam Lemel, a 17-year-old high school student who collapsed and died while playing basketball. Adam suffered a sudden cardiac arrest and an AED was not available.

Since its inception, Project ADAM has saved over 200 lives across the country.



Project ADAM®
SAVES LIVES



42 ESTABLISHED PROGRAMS **32** STATES

USA In Progress Sites
Canada In Progress Site; Alberta, Canada

Updated February, 2024

ESTABLISHED AFFILIATE SITES

Children's Wisconsin/National Office

Children's Healthcare of Atlanta

Children's Hospital of Philadelphia

Children's of Alabama

Providence Sacred Heart Children's Hospital

Cook Children's Medical Center

East Tennessee Children's Hospital

U-M Health C.S. Mott Children's Hospital

Children's Hospital Colorado

UC Davis Children's Hospital

Nationwide Children's Hospital

Texas Children's Hospital

Monroe Carell Jr. Children's Hospital at Vanderbilt

Arkansas Children's

Cincinnati Children's

Golisano Children's Hospital, Southwest Florida

KU Wichita Pediatrics

Nicklaus Children's Hospital

Duke Children's Hospital

Ann & Robert H. Lurie Children's Hospital of Chicago

MUSC Shawn Jenkins Children's Hospital

Cleveland Clinic Children's

Ochsner Hospital for Children

Children's Mercy Kansas City

WVU Medicine Children's

Rady Children's Hospital

Riley Hospital for Children at IU Health

Maria Fareri Children's Hospital

University of Mississippi Medical Center/Children's Hospital

Le Bonheur Children's Hospital

University of Iowa Stead Family Children's Hospital

Yale New Haven Children's Hospital

Children's Minnesota / Children's Heart Clinic

St. Louis Children's Hospital

USA Women and Children's Hospital

Children's Hospital & Medical Center

Hasbro Children's Hospital

Children's Hospital of Richmond at VCU

Phoenix Children's Hospital

Kentucky Children's Hospital

Norton Children's Hospital

Nemours Children's Health

In collaboration with Children's Hospital Colorado, Project ADAM Colorado is a program committed to helping schools implement and sustain a public access defibrillation program. The goals of the program are to:

- Increase awareness of the signs and symptoms of sudden cardiac arrest
- Provide staff with the necessary resources to best prepare for a cardiac emergency
- Offer guidance for conceptualization and planning a program in your school
- Assist with acquiring training in CPR and AED use
- Collaborate with staff on the development of an emergency response plan

Why target schools to develop Public Access Defibrillation Programs?

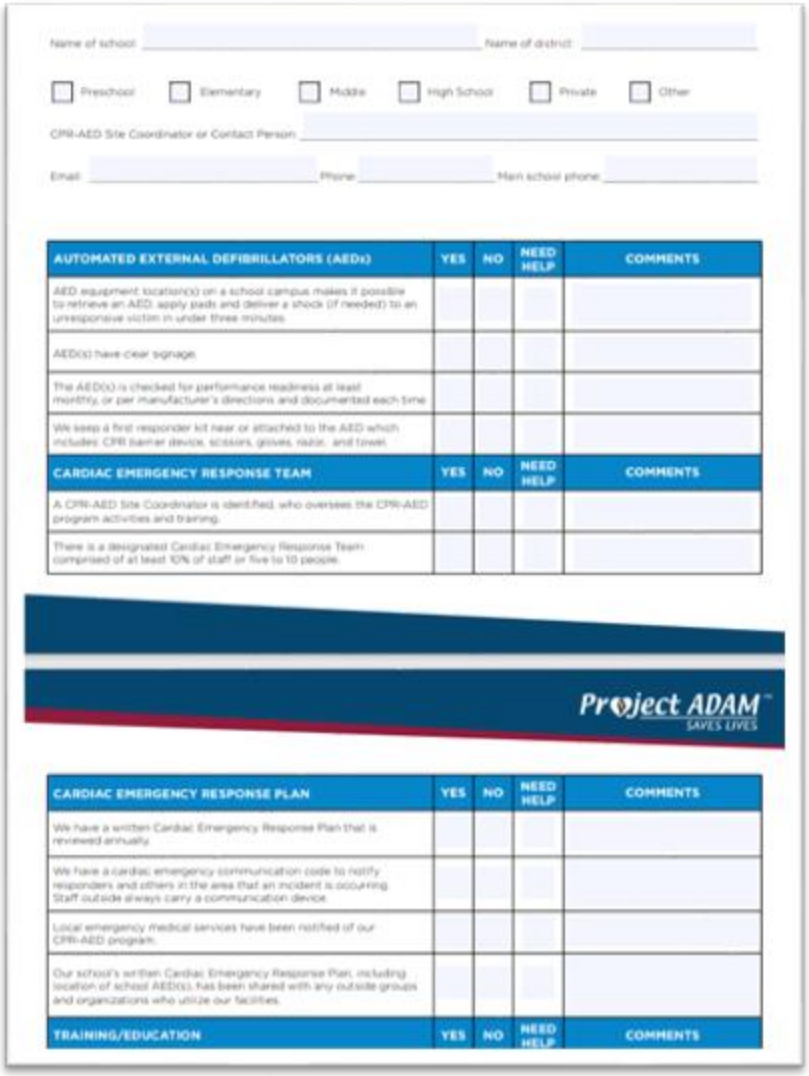
On any given day, approximately 20 percent of the community is in its schools.

In Colorado, there are 179 school districts (2022-2023).
146 districts meet the definition of rural or *small* rural.

Average EMS response time is 14 minutes in rural settings, with nearly 1 of 10 encounters waiting almost a half hour for the arrival of EMS personnel.
JAMA Surg. 2017 Oct; 152 (10)L 983-984

Preparing your school for a cardiac emergency:

WHERE DO I START?



Name of school: _____ Name of district: _____

☐ Preschool ☐ Elementary ☐ Middle ☐ High School ☐ Private ☐ Other

CPR-AED Site Coordinator or Contact Person: _____

Email: _____ Phone: _____ Main school phone: _____

AUTOMATED EXTERNAL DEFIBRILLATORS (AEDs)	YES	NO	NEED HELP	COMMENTS
AED equipment location(s) on a school campus makes it possible to retrieve an AED, apply pads and deliver a shock (if needed) to an unresponsive victim in under three minutes.				
AED(s) have clear signage.				
The AED(s) is checked for performance readiness at least monthly, or per manufacturer's directions and documented each time.				
We keep a first responder kit near or attached to the AED which includes: CPR barrier device, scissors, gloves, razor, and towel.				
CARDIAC EMERGENCY RESPONSE TEAM	**YES**	**NO**	**NEED HELP**	**COMMENTS**
A CPR-AED Site Coordinator is identified, who oversees the CPR-AED program activities and training.				
There is a designated Cardiac Emergency Response Team comprised of at least 10% of staff or five to 10 people.				

Project ADAM™ SAVES LIVES

CARDIAC EMERGENCY RESPONSE PLAN	YES	NO	NEED HELP	COMMENTS
We have a written Cardiac Emergency Response Plan that is reviewed annually.				
We have a cardiac emergency communication code to notify responders and others in the area that an incident is occurring. Staff outside always carry a communication device.				
Local emergency medical services have been notified of our CPR-AED program.				
Our school's written Cardiac Emergency Response Plan, including location of school AED(s), has been shared with any outside groups and organizations who utilize our facilities.				
TRAINING/EDUCATION	**YES**	**NO**	**NEED HELP**	**COMMENTS**

The Heart Safe School Checklist:

1. The Heart Safe School checklist is a tool to serve as an initial assessment of your school/district.
2. There are 14 checkpoints based upon best practices in school-based cardiac emergency preparedness.
3. The main categories are:
    1. AEDs
    2. Cardiac emergency response team
    3. Cardiac emergency response plan
    4. Staff training/education
    5. AED drills

Schools partnering with Project ADAM will aim to achieve the following recommendations:

1. Establish a Cardiac Emergency Response Team
2. Activate the team in response to a SCA
3. Implement AED placement and routine maintenance within the school
4. Disseminate the plan throughout the school campus
5. Maintain ongoing staff training in CPR/AED use

continued:

6

Practice AED drills

7

Integrate local EMS with the plan

8

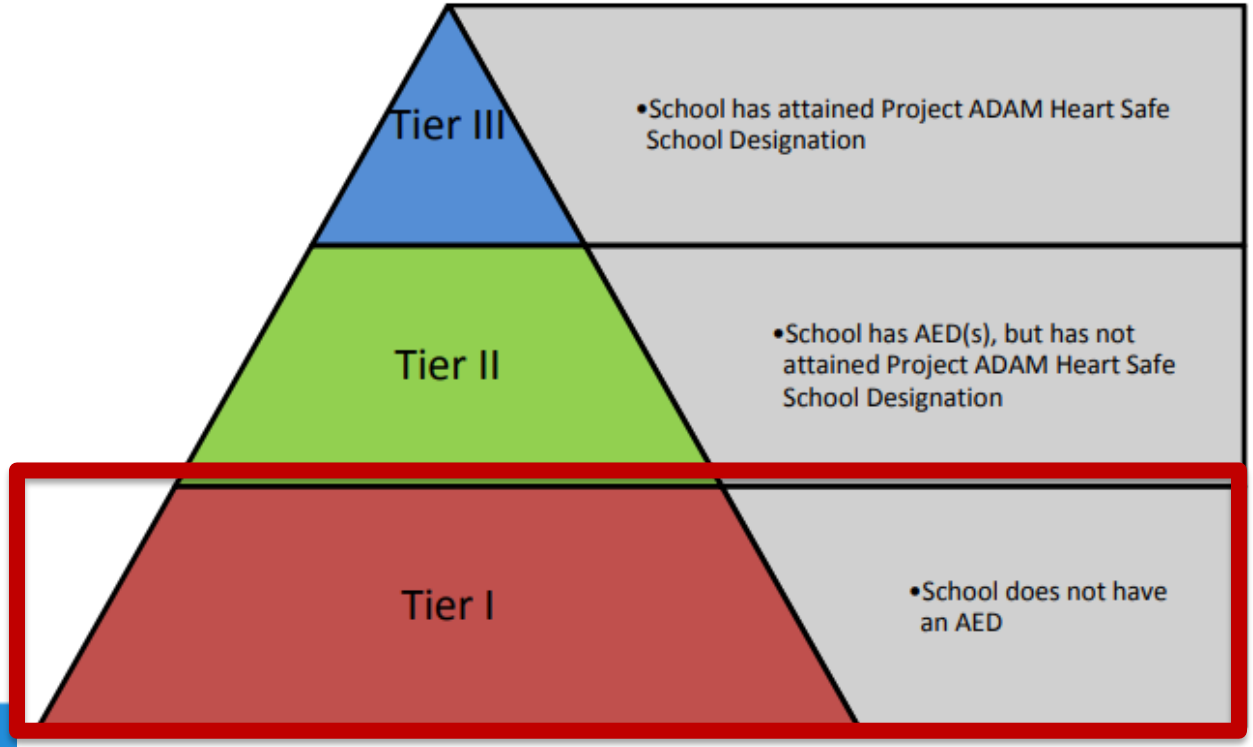
Review and evaluate the plan on an ongoing and annual basis

HEART SAFE SCHOOLS

Heart Safe Schools

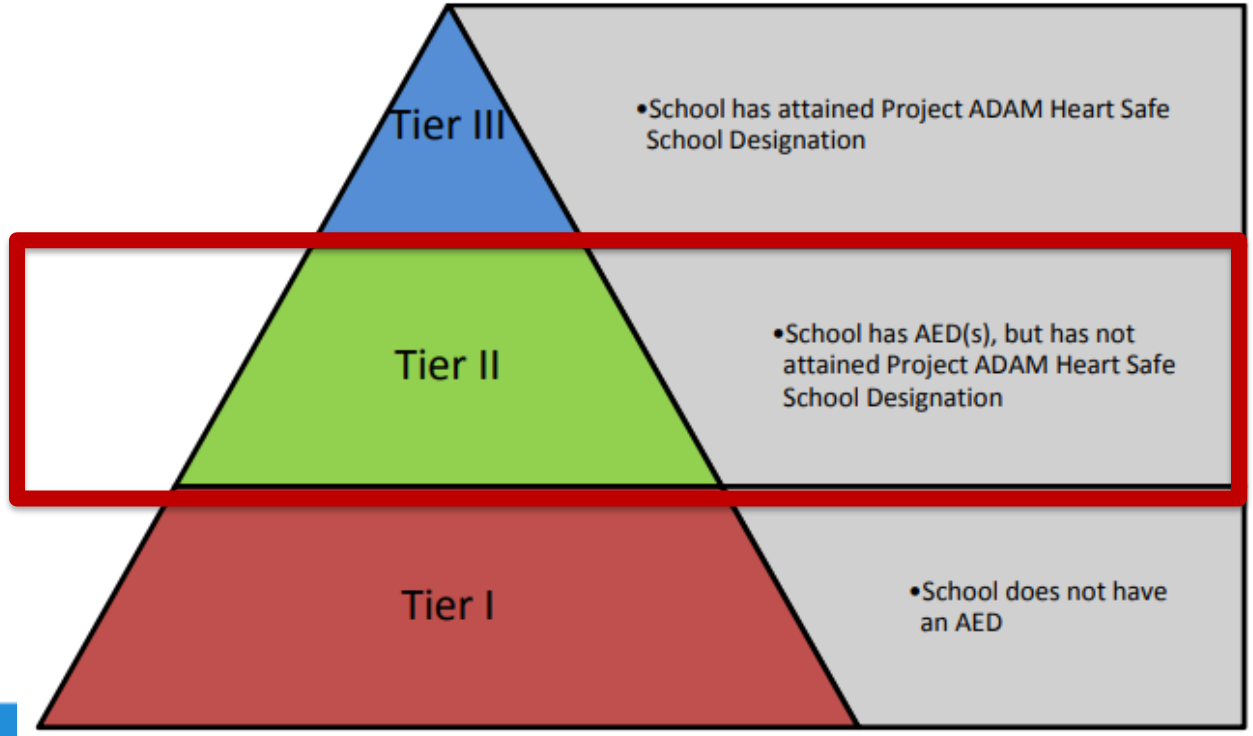
Project ADAM strives to assist schools and communities in establishing an emergency plan to place into action in the incidence of a sudden cardiac arrest. Lives are saved when schools are prepared not only with a documented plan, but also with a cardiac response team, in addition to being well trained and practiced on how to respond in the event of a cardiac emergency.

Project ADAM Heart Safe School designation is attained by schools upon successful implementation of a **quality** sudden cardiac arrest program of awareness, training and effective emergency response to promote a Heart Safe environment for students, visitors and staff.

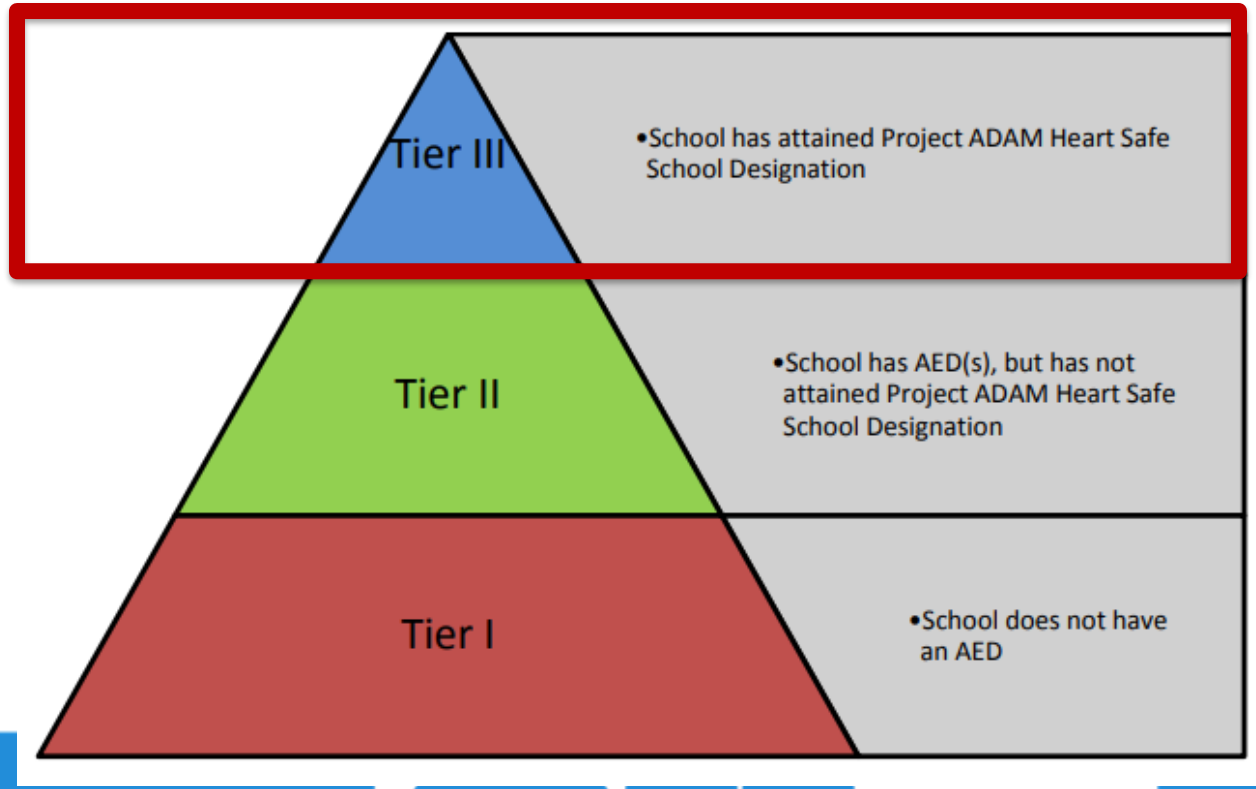


Tier I indicates the school does not have an AED. Emphasis is placed on identifying funding opportunities, appointing a Project ADAM site coordinator and educating school staff on the importance of CPR and AEDs in the school setting.

Tier II indicates the school has an AED(s) but has not achieved Project ADAM Heart Safe School Designation. The school will focus on initiating regular cardiac emergency response drills and enhancing communication and training opportunities.



Tier III indicated the school has achieved Project ADAM Heart Safe School Designation. This includes accessible AEDs, CPR-AED trained staff and a written and practiced plan to respond to SCA.



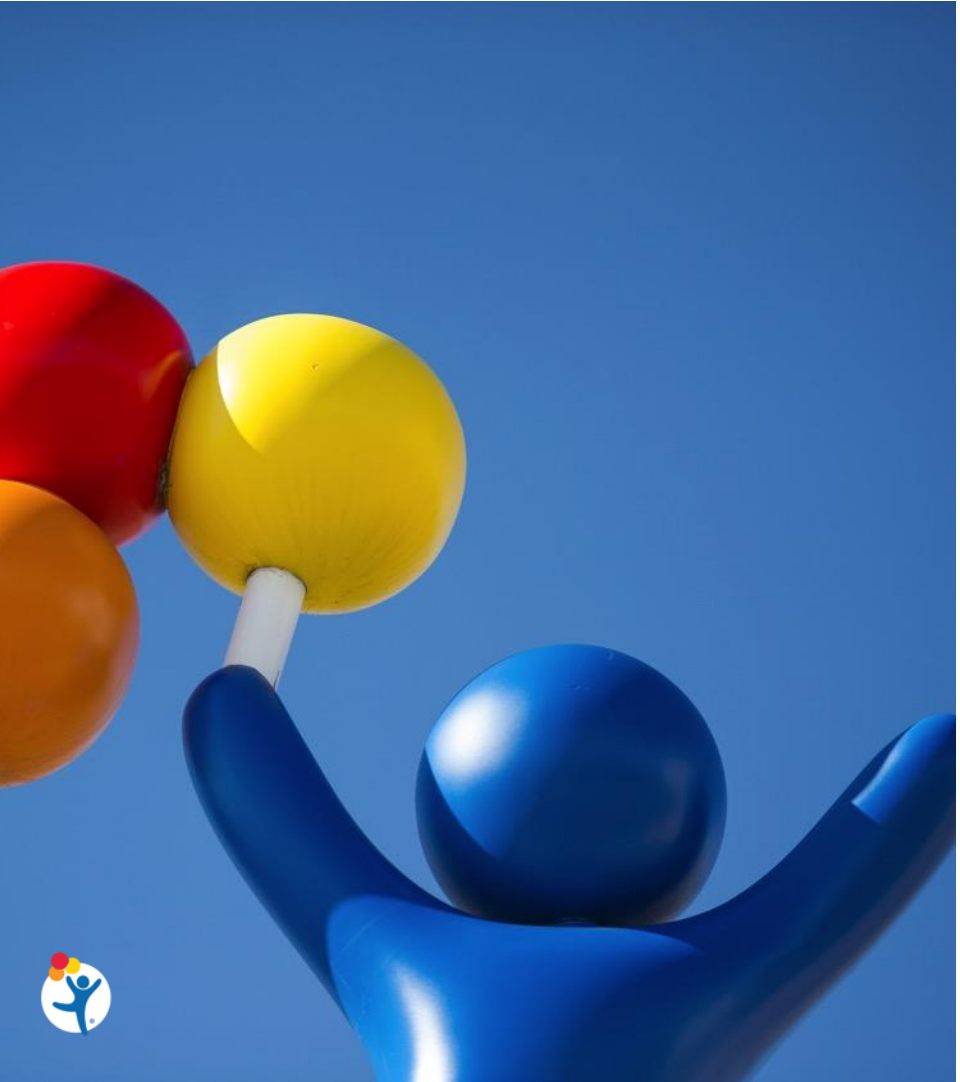
IT TAKES A VILLAGE

Project ADAM recommends including a number of key school, medical and community partners in order to implement and sustain a successful program.

Project ADAM School Site Coordinator

To build a sustainable school program it is critical to identify an individual willing to serve as the Project ADAM school site coordinator. This person can be a:

- School nurse
- Athletic director
- Athletic trainer
- Physical education teacher
- Teacher
- Administrator
- Other willing individual



Resources available

-Heart Safe School:
    Checklists
    Toolkit
    Training videos
-Policy Statements
-Cardiac Emergency Response Plan templates
-Letters for EMS, facility users, extracurricular/community groups
-Information on how to conduct cardiac drills in your school
-AED incident debriefing

Adam | The Issue | Heart Safe Initiatives | Our Team | CPR Resources | Advocacy | Saves | Join Our Team

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Project ADAM saves lives.

Project ADAM unites healthcare systems across the nation to promote and support implementation of Heart Safe Schools.

Learn More

Support Us

To make a donation to Project ADAM, visit our Donation Link.

Our Mission

Contact us

If you have questions or know someone who could benefit from Project ADAM, please contact the National Office.

projectadam@childrenswi.org

Project ADAM Save in Atlanta

Thank you!

Questions?

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