

## Complete Summary

### GUIDELINE TITLE

Inter-Association Task Force recommendations on emergency preparedness and management of sudden cardiac arrest in high school and college athletic programs: a consensus statement.

### BIBLIOGRAPHIC SOURCE(S)

Drezner JA, Courson RW, Roberts WO, Mosesso VN, Link MS, Maron BJ. Inter-association Task Force recommendations on emergency preparedness and management of sudden cardiac arrest in high school and college athletic programs: a consensus statement. J Athl Train 2007 Jan-Mar;42(1):143-58. [88 references] [PubMed](#)

### GUIDELINE STATUS

This is the current release of the guideline.

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## SCOPE

### DISEASE/CONDITION(S)

Sudden cardiac arrest

### GUIDELINE CATEGORY

Management

### CLINICAL SPECIALTY

Cardiology  
Emergency Medicine  
Family Practice  
Pediatrics  
Sports Medicine

## **INTENDED USERS**

Emergency Medical Technicians/Paramedics  
Health Care Providers  
Physicians

## **GUIDELINE OBJECTIVE(S)**

- To assist those in high school and college athletic programs prepare for and respond to an unexpected sudden cardiac arrest (SCA)
- To summarize essential information regarding SCA in young athletes
- To define appropriate emergency preparedness for SCA at athletic venues
- To establish uniform recommendations for the management of SCA in athletes

## **TARGET POPULATION**

High school and college athletes

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Management of Sudden Cardiac Arrest**

1. Establishment of an emergency action plan (EAP), including access to early defibrillation, emergency communication, emergency personnel, emergency equipment, and emergency transportation
2. Early activation of emergency medical services (EMS), early cardiopulmonary resuscitation (CPR), early defibrillation, and rapid transition to advanced cardiac life support (ACLS)
3. Practice and review of the EAP
4. Postevent planning
5. Management of SCA in special circumstances (cervical spine injury; commotio cordis; exertional heat stroke; lightning; mass events; and rainy, wet, ice, or metal surfaces)

## **MAJOR OUTCOMES CONSIDERED**

- Rate of cardiopulmonary resuscitation
- Time interval to effective intervention
- Survival

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Searches of Electronic Databases

**DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

Review of selected studies and other consensus or scientific statements relevant to this topic

**NUMBER OF SOURCE DOCUMENTS**

Not stated

**METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Expert Consensus (Committee)

**RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

Not applicable

**METHODS USED TO ANALYZE THE EVIDENCE**

Review

**DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

**METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

**DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

The National Athletic Trainers' Association (NATA) convened an Inter-Association Task Force in Atlanta, Georgia, on April 24, 2006, to develop consensus recommendations on emergency preparedness and management of sudden cardiac arrest (SCA) in high school and college athletic programs. The task force included representatives from 15 national organizations with special interest in SCA in young athletes and a multidisciplinary group of health care professionals from athletic training, cardiology, electrophysiology, emergency medicine, emergency medical technicians, family medicine, orthopaedics, paramedics, pediatrics, physical therapy, and sports medicine.

**RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

**COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

Comparison with Guidelines from Other Groups

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

All recommendations in this statement are in agreement with the 2005 American Heart Association (AHA) guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiovascular care (ECC), the AHA scientific statement on response to cardiac arrest and selected life-threatening medical emergencies and the medical emergency response plan for schools, and the National Athletic Trainers' Association (NATA) position statement on emergency planning in athletics.

## **RECOMMENDATIONS**

### **MAJOR RECOMMENDATIONS**

#### **Emergency Preparedness**

- Every school or institution that sponsors athletic activities should have a written and structured emergency action plan (EAP).
- The EAP should be developed and coordinated in consultation with local emergency medical services (EMS) personnel, school public safety officials, on-site first responders, and school administrators.
- The EAP should be specific to each individual athletic venue and encompass emergency communication, personnel, equipment, and transportation to appropriate emergency facilities.
- The EAP should be reviewed and practiced at least annually with certified athletic trainers, team and consulting physicians, athletic training students, school and institutional safety personnel, administrators, and coaches (Andersen et al., 2002).
- Targeted first responders should receive certified training in cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) use.
- Access to early defibrillation is essential, and a target goal of less than 3 to 5 minutes from the time of collapse to the first shock is strongly recommended (Hazinski et al., 2004; ECC Committee, "Adult basic life support," 2005).
- Review of equipment readiness and the EAP by on-site event personnel for each athletic event is desirable.

#### **Management of Sudden Cardiac Arrest**

- The initial components of sudden cardiac arrest (SCA) management are early activation of EMS, early CPR, early defibrillation, and rapid transition to advanced cardiac life support (ACLS).
- SCA should be suspected in any collapsed and unresponsive athlete.
- An AED should be applied as soon as possible on any collapsed and unresponsive athlete for rhythm analysis and defibrillation if indicated.
- CPR should be provided while waiting for an AED.

- Interruptions in chest compressions should be minimized and CPR stopped only for rhythm analysis and shock.
- CPR should be resumed immediately after the first shock, beginning with chest compressions, with repeat rhythm analysis after every 2 minutes or 5 cycles of CPR, and continued until advanced life support providers take over or the victim starts to move ECC Committee, "Adult basic life support," 2005; ECC Committee, "Electrical therapies," 2005).
- SCA in athletes can be mistaken for other causes of collapse, and rescuers should be trained to recognize SCA in athletes with special focus on potential barriers to recognizing SCA, including inaccurate rescuer assessment of pulse or respirations, occasional or agonal gasping, and myoclonic jerking or seizure-like activity.
- Young athletes who collapse shortly after being struck in the chest by a firm projectile or by player contact should be suspected of having SCA from commotio cordis.
- Rapid access to the SCA victim should be facilitated for EMS personnel.

### **Special Circumstances**

#### **Cervical Spine Injuries**

Any athlete suspected of having a cervical spine injury should not be moved, and the cervical spine should be immobilized. Unconscious athletes in collision sports are presumed to have unstable spine injuries until proved otherwise. High cervical spine injuries can cause apnea, ineffective breathing patterns, and paralysis of the phrenic nerve. Although rare, prolonged hypoxemia can lead to cardiac arrest. Protective equipment used in collision sports such as football and hockey makes the management of SCA in a spine-injured athlete difficult. The facemask should be removed (leaving the helmet in place) as soon as possible before transportation, regardless of respiratory status and even if the athlete is conscious. Shoulder pads should also be opened (but not removed) before transportation to provide access to the chest if CPR or defibrillation is required. A designated rescuer must be responsible for manually stabilizing the head and neck during CPR and any transfer of the victim. The rescuer responsible for neck stabilization should disengage if defibrillation is necessary. For more information on the care of the spine-injured athlete, refer to "Prehospital Care of the Spine-Injured Athlete," available at <http://www.nata.org/statements/consensus/NATAPreHospital.pdf>.

#### **Commotio Cordis**

Commotio cordis, also called cardiac concussion, involves a blunt, nonpenetrating blow to the chest during a vulnerable phase of ventricular repolarization, leading to a ventricular arrhythmia with no structural damage or cardiac contusion present. Commotio cordis occurs most commonly in young male adolescents (mean age = 13.6 years) with compliant chest walls. Approximately 80% of cases involve blunt chest impact by a firm projectile, such as a baseball, softball, hockey puck, or lacrosse ball, and 20% of cases are due to chest contact with another person. To date, commercially available chest protectors have not been shown to prevent commotion cordis. Survival after commotio cordis closely depends on the time to defibrillation. Overall survival as reported from the United States Commotio Cordis Registry was only 16%, but for those victims still in ventricular

fibrillation (VF) who were reached in time to receive defibrillation, the survival rate was 46%. Young athletes who collapse shortly after being struck in the chest should be suspected of having commotio cordis until the athlete is clearly responsive. Rescuers can improve survival by promptly recognizing SCA due to commotio cordis, activating the EMS system, immediately initiating CPR, and using an AED as soon as possible.

### **Exertional Heat Stroke**

Heat stroke is a life-threatening emergency, and treatment of concurrent cardiac arrest requires simultaneously cooling the athlete and performing CPR. The presence of exertional heat stroke in a collapsed athlete must be suspected in hot, humid environments, especially if the athlete is wearing athletic clothing and equipment that limits heat loss, and the EMS system must be activated. Both heat exhaustion and heat stroke can cause syncope in the athlete. Heat stroke is differentiated by the presence of mental status changes and a core temperature of greater than 40 degrees C (104 degrees F). Untreated exertional heat stroke can progress to end-organ damage, adult respiratory distress syndrome, disseminated intravascular coagulation, neurologic injury, cardiac arrest, and death. The diagnosis of heat stroke can be confirmed on-site with a rectal temperature measurement. If the athlete is unresponsive but has normal breathing and circulation, rapid cooling by ice water bath immersion is recommended. If an ice water tub is not available or if concurrent SCA is suspected, rotating ice water towels applied to the head, trunk, and extremities and ice packs applied to the neck, axilla, and groin represent an alternative method for cooling while performing CPR and using an AED. Because prompt temperature reduction is critical, transport to the emergency department for heat stroke victims without SCA should be delayed if sideline cooling measures, such as ice water bath immersion, are available. Cooling should also be continued during transport if needed.

### **Lightning**

Lightning presents an environmental hazard with the potential for multiple victims. If the lightning storm is ongoing, rescuers must ensure their personal safety by moving an SCA victim indoors if possible. Spine immobilization should be considered. Cardiac arrest from lightning strike is associated with significant mortality and requires modification of standard ACLS measures to achieve successful resuscitation. Most lightning strike victims have associated multisystem involvement, including neurologic complications, cutaneous burns, soft tissue injury such as rhabdomyolysis, and associated blunt trauma. When managing several lightning strike victims, the normal multiple casualty triage priorities are reversed. Casualties who appear unresponsive require prompt, aggressive resuscitation using standard CPR and ACLS protocols, including defibrillation and cardiac pharmacotherapy. The chance for a successful outcome is greater for lightning-related cardiac arrest, even with initial rhythms that are traditionally unresponsive to therapy.

### **Mass Events**

Emergency preparation and management of SCA at mass athletic events require additional planning. Schools and institutions may have their own athletic staffs

with them, and advanced communication with the host organization is helpful to ensure that visiting athletic staffs are familiar with the EAP and central medical area or equipment. Distance events such as cross-country meets, triathlons, and marathons present an additional challenge because running or biking courses are often spread out over long distances, sometimes in remote areas. Among marathoners, SCA occurs in approximately 1 in 40,000 runners across the age spectrum. Distributing medical staff and AEDs along the course or field of play and using bicycle or "golf-cart" rescue teams will improve response times should an emergency arise.

### **Rainy, Wet, Ice, and Metal Surfaces**

Defibrillators used in a wet environment or on an ice playing surface are considered safe and do not pose a shock hazard for rescuers or bystanders. If a collapsed victim with suspected SCA is lying on a wet surface or in a puddle, the patient should not be moved to avoid delays in initiating CPR. Simulation of a patient and a rescuer in a wet environment does not show a significant risk of electric shock. Responders to an SCA on an ice playing surface should consider foot traction devices and helmets for their own safety. In contrast, SCA victims found immersed in a pool or contained body of water should be removed from the water before defibrillation. Any SCA victims lying on metal conducting surfaces (e.g., bleachers) should be moved to a nonmetal surfaces or placed onto spine boards before defibrillation if that can be done quickly and without significant delays.

### **Conclusions**

The most important factor in SCA survival is the presence of a trained rescuer who can initiate CPR and has access to early defibrillation. The athletic community is in a unique position to have trained coaches, officials, and other targeted responders, and, in some circumstances, on-site athletic trainers, school nurses, and team physicians respond immediately to SCA at organized athletic events and practices. Comprehensive emergency planning is needed for high school and college athletic programs to ensure an efficient and structured response to SCA. Essential elements to an EAP include establishing an effective communication system, training of anticipated responders in CPR and AED use, access to an AED for early defibrillation, acquisition of necessary emergency equipment, coordination and integration of on-site responder and AED programs with the local EMS system, and practice and review of the response plan. High suspicion of SCA should be maintained in any collapsed and unresponsive athlete, with application of an AED as soon as possible for rhythm analysis and defibrillation if indicated. Interruptions in chest compressions for rhythm analysis and shock delivery should be minimized, and rescuers should be prepared to resume CPR, beginning with chest compressions, as soon as a shock is delivered. Improved education in the recognition of SCA, enhanced emergency preparedness, training in current CPR protocols, and increased access to AEDs for early defibrillation are needed to improve survival from SCA in athletics.

### **CLINICAL ALGORITHM(S)**

An algorithm is provided in the original guideline document for management of sudden cardiac arrest.

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

Appropriate emergency preparedness and management of sudden cardiac arrest in high school and college athletic programs

### POTENTIAL HARMS

Not stated

## QUALIFYING STATEMENTS

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The National Athletic Trainers' Association (NATA) and the Inter-Association Task Force advise individuals, schools, and institutions to carefully and independently consider each of the recommendations. The information contained in the statement is neither exhaustive nor exclusive to all circumstances or individuals. Variables such as institutional human resource guidelines, state or federal statutes, rules, or regulations, as well as regional environmental conditions, may impact the relevance and implementation of these recommendations. The NATA and the Inter-Association Task Force advise their members and others to carefully and independently consider each of the recommendations (including the applicability of same to any particular circumstance or individual). The foregoing statement should not be relied on as an independent basis for care but rather as a resource available to NATA members or others. Moreover, no opinion is expressed herein regarding the quality of care that adheres to or differs from any of NATA's position statements. The NATA and the Inter-Association Task Force reserve the right to rescind or modify their statements at any time.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

### IMPLEMENTATION TOOLS



Chart Documentation/Checklists/Forms  
Clinical Algorithm

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness  
Timeliness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Drezner JA, Courson RW, Roberts WO, Mosesso VN, Link MS, Maron BJ. Inter-association Task Force recommendations on emergency preparedness and management of sudden cardiac arrest in high school and college athletic programs: a consensus statement. J Athl Train 2007 Jan-Mar;42(1):143-58. [88 references] [PubMed](#)

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2007 Mar

### GUIDELINE DEVELOPER(S)

National Athletic Trainers' Association - Professional Association

### SOURCE(S) OF FUNDING

National Athletic Trainers' Association

### GUIDELINE COMMITTEE

Inter-Association Task Force

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*Task Force Members:* Ron W. Courson, ATC, PT, NREMT-I (*Co-Chair*) Director of Sports Medicine, University of Georgia; Jonathan A. Drezner, MD (*Co-Chair*) Associate Professor and Team Physician, Department of Family Medicine, University of Washington

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **ENDORSER(S)**

American College of Sports Medicine - Medical Specialty Society  
American Orthopaedic Society for Sports Medicine  
Heart Rhythm Society - Professional Association  
Hypertrophic Cardiomyopathy Association - Professional Association  
National Association of Emergency Medical Services Physicians  
Parent Heart Watch - Professional Association  
Sudden Cardiac Arrest Association - Professional Association

## **GUIDELINE STATUS**

This is the current release of the guideline.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [National Athletic Trainers' Association](#).

## **AVAILABILITY OF COMPANION DOCUMENTS**

An Emergency Action Plan Checklist is available in the [original guideline document](#).

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI Institute on July 13, 2007. The information was verified by the guideline developer on July 16, 2007.

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