Sudden cardiac arrest is the leading cause of death in young athletes while training or participating in sport competition. Even athletes who appear healthy and have a normal preparticipation screening may have underlying heart abnormalities that can be life threatening.

What is Sudden Cardiac Arrest?
- Occurs suddenly and often without warning.
- An electrical malfunction (short-circuit) causes the bottom chambers of the heart (ventricles) to beat dangerously fast (ventricular tachycardia or fibrillation) and disrupts the pumping ability of the heart.
- The heart cannot pump blood to the brain, lungs and other organs of the body.
- The person loses consciousness (passes out) and has no pulse.
- Death occurs within minutes if not treated immediately.

What are the symptoms/warning signs of Sudden Cardiac Arrest?
- Fainting/blackouts (especially during exercise)
- Dizziness
- Unusual fatigue/weakness
- Chest pain
- Shortness of breath
- Nausea/vomiting
- Palpitations (heart is beating unusually fast or skipping beats)
- Family history of sudden cardiac arrest at age < 50

ANY of these symptoms/warning signs that occur while exercising may necessitate further evaluation from your physician before returning to practice or a game. **Note that a student-athlete who exhibits unexplained fainting may be SCA because it is the number one warning sign of a potential heart condition.**

There is potential for effective secondary prevention of sudden cardiac death by having automated external defibrillators (AEDs) easily accessible and trained staff available. The presence of trained individuals and access to AEDs at sporting venues provides a potential means of early defibrillation, not only for athletes but also for spectators, coaches, officials, event staff and other attendees in the case of sudden cardiac arrest.

It is advisable to have an Emergency Action Plan in place for all sport practice and competition sites that outlines the plan of action in case of the sudden collapse of an athlete. It is advisable to review and practice the emergency action plan with respective school personnel, coaches, on site medical personnel and local EMS.

**Time is Critical:** If not properly treated within minutes, SCA is fatal in 92% of cases.

**Basic actions include:**
1. have a cell phone available at all venues
2. immediately activate EMS
3. Immediately initiate continuous CPR (push hard, push fast, push often)

Your school’s medical personnel (team physician, licensed athletic trainer, school nurse) and/or local EMS may wish to assist in the development and implementation, if not already in place, of the emergency preparedness plan for the management of the collapsed athlete. The “Inter-association task Force
recommendations on emergency Preparedness and Management of sudden cardiac arrest in high school and college athletic Programs; a "consensus statement" is one source of guidance as to the development and implementation of an emergency action plan for the management of sudden cardiac arrest in an athlete.

What are ways to screen for Sudden Cardiac Arrest?

- The American Heart Association recommends a pre-participation history and physical including 12 important cardiac elements.
- The WIAA Pre-Participation Physical Evaluation – Medical History form includes ALL 12 of these important cardiac elements and is mandatory bi-annually.
- Additional screening using an electrocardiogram and/or an echocardiogram is readily available to all athletes, but is not mandatory.

### Sudden Cardiac Arrest vs. Heart Attack

<table>
<thead>
<tr>
<th>Sudden Cardiac Arrest (SCA)</th>
<th>Heart Attack</th>
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<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>The medical term for a heart attack is myocardial infarction: a blockage of</td>
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<td>SCA is a chaotic electrical condition of the heart resulting in the loss of blood flow</td>
<td>the coronary arteries leading to a decrease in blood flow. When this happens,</td>
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<td>to the brain and body. The most common form of SCA is ventricular fibrillation.</td>
<td>the heart muscles die or become permanently damaged.</td>
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<td><strong>Causes</strong></td>
<td>Plaque made of cholesterol and other cells builds up in the walls of the</td>
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<tr>
<td>Electrical impulses of the heart become chaotic due to a blow to the chest or other</td>
<td>heart’s arteries. When the buildup is great enough, the plaque creates a</td>
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<td>(sometimes-unknown) health-related issues. As a result, the heart stops beating regularly</td>
<td>blockage, known as an occlusion, which restricts the blood supply to the heart</td>
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<td>and begins to flutter rapidly.</td>
<td>muscle.</td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td>Warning signs of heart attack include a tightening feeling in the chest, a</td>
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<td>Typically, there are no symptoms to SCA. Usually, the first indication of SCA is when</td>
<td>sore or numb left arm, lower back, neck, and/or jaw. Other signs include bad</td>
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<td>the victim faints. The second sign is breathing cessation.</td>
<td>indigestion, a feeling that something heavy is sitting on your chest, and</td>
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<td></td>
<td>shortness of breath.</td>
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<td><strong>Victim's Response</strong></td>
<td>The victim of a heart attack is usually conscious and alert.</td>
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<td>A sudden cardiac arrest victim always loses consciousness from lack of oxygen.</td>
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<td><strong>Risk of Death</strong></td>
<td>Most victims can recover fully and lead normal lives, but about a third of</td>
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<td>A victim of SCA will die unless treated. If left untreated, the chances of survival</td>
<td>heart attacks are deadly. A heart attack can lead to sudden cardiac arrest.</td>
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<td>decrease by 10% per minute. Typically, permanent brain damage occurs</td>
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</table>
The only treatment for SCA is defibrillation from an automated external defibrillator (AED). A shock from the AED stops the chaotic electrical activity and allows the heart's sinus node to resume a normal electrical impulse. One treatment of a heart attack can be angioplasty, which opens up the blocked vessels with a medical balloon. Afterwards, a stent can be placed in the artery to help keep it open. Other treatments include clot-busting drugs called thrombolytics or nitroglycerin to reduce chest pain.

What Causes Sudden Cardiac Arrest?

Conditions present at birth:
- Inherited (passed on from parents/relatives) conditions of the heart muscle:
  - Hypertrophic Cardiomyopathy – hypertrophy (thickening) of the left ventricle; the most common cause of sudden cardiac arrest in athletes in the U.S.
  - Arrhythogenic Right Ventricular Cardiomyopathy – replacement of part of the right ventricle by fat and scar; the most common cause of sudden cardiac arrest in Italy.
  - Marfan Syndrome – a disorder of the structure of blood vessels that makes them prone to rupture; often associated with very long arms and unusually flexible joints.
- Inherited conditions of the electrical system:
  - Long QT Syndrome – abnormality in the ion channels (electrical system) of the heart.
  - Catecholaminergic Polymorphic Ventricular Tachycardia and Brugada Syndrome – other types of electrical abnormalities that are rare but run in families.
- Non-Inherited (not passed on from the family, but still present at birth) conditions:
  - Coronary Artery Abnormalities – abnormality of the blood vessels that supply blood to the heart muscle. The second most common cause of sudden cardiac arrest in athletes in the U.S.
  - Aortic valve abnormalities – failure of the aortic valve (the valve between the heart and the aorta) to develop properly; usually causes a loud heart murmur.
  - Non-compaction Cardiomyopathy – a condition where the heart muscle does not develop normally.
  - Wolff-Parkinson-White Syndrome – an extra conducting fiber is present in the heart’s electrical system and can increase the risk of arrhythmias.

Conditions not present at birth but acquired later in life:
- Commotio Cordis – concussion of the heart that can occur from being hit in the chest by a ball, puck, or fist.
- Myocarditis – infection/inflammation of the heart, usually caused by a virus.
- Recreational/Performance- Enhancing drug use.

Idiopathic: Sometimes the underlying cause of the Sudden Cardiac Arrest is unknown, even after autopsy.