Welcome to the New York Statewide School Health Services 2012 webinar series produced by the New York Statewide School Health Services Center, a contracted office of the New York State Education Department. Our vision is to ensure that school health services are effective in addressing the health and safety needs of students by providing leadership and direction to school health professionals, parents, school districts and community organizations. Completing professional development can be challenging for school health professionals due to constraints of time or budgets or both. These webinars were produced to address those challenges and support professional growth. If you would like to print out the notes from this course or access a glossary of terms, they can be found in the attachments tab in the upper right hand corner. Additional attachments associated with this course can be found underneath the course link on the Professional Learning Page.
This webinar will provide an overview of the causes and prevalence of common heart conditions identified in school age children. In addition, it will provide information on symptoms which would indicate the need for referral to the private health care provider. The coordinated school health services team, including the school medical director and school nurse can assist private health care providers by extending the medical home directly into the school home to coordinate care with the family. School nurses can serve as clinical care givers and educators for students, parents and staff. Prompt access to CPR and Automatic External Defibrillation are essential components of prevention and care for cardiac emergencies. Regulations and legislation requiring Public Access Defibrillation Programs and successful implementation within the school setting will be addressed.
Heart disease is not a major cause of death among children and teenagers, but it is the largest cause of death among adults in the United States. At least 58.8 million people in this country suffer from some form of heart disease. For persons ages 15-24, the CDC ranks cardiovascular disease as the 5th leading cause of death from 1997-2007. Research has identified risk factors that play an important role in developing heart disease. Most risk factors that affect children can be controlled early in life, lowering the risk of heart disease later in life. These include high blood pressure, high cholesterol, smoking, obesity and physical inactivity. Other risk factors may be passed down through family members or are the result of another illness or disease. School nurses and other members of the coordinated school health team play a significant role in providing heart health education and risk identification of all students, as well as care for students affected with cardiac disease which will support their physical, emotional, and academic success. Whether you are a School Nurse, School Medical Director, Coach, Teacher or Administrator, learning more about heart conditions which may affect school age students is an important first step toward building a heart-safe community for all youth.
In December 2011, the American Academy of Pediatrics released a report entitled *Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents*. These guidelines from the Expert Panel appointed by the National Heart, Lung, and Blood Institute (NHLBI) and endorsed by the American Academy of Pediatrics (AAP) gives evidence-based recommendations to reduce the risk factors for heart disease in children. They include emphasizing a diet low in saturated fat starting at age 1, encouraging protection from tobacco smoke, and the importance of at least one hour of physical activity daily. The panel recommends that all adolescents undergo lipid screening for non-fasting non-HDL-cholesterol levels or a fasting lipid panel between the ages of 9 and 11 years followed by another full lipid screening test between 18 and 21 years of age. They also recommend measuring fasting glucose levels to test for diabetes in children 10 years of age (or at the onset of puberty) who are overweight with other risk factors, including a family history for type 2 diabetes mellitus. Obesity continues to be an increasing risk factor impacting both youth and adults in multiple health areas. This impact will be reviewed on the next slide. The guidelines can be accessed from the related documents link below this webinar and under “H” for Heart Health in our A-Z index.
Obesity is a major risk factor for heart disease and many other chronic diseases such as type-2 diabetes, and has been linked to more than 110,000 deaths in the United States each year. Childhood obesity has more than tripled in the past 30 years. Legislation passed in 2007 amended NY Education Law requiring school districts to report student weight status category and health conditions information to the New York State Department of Health (NYSDOH). The data provided in the 2008-2010 Student Weight Status Category Report indicated that approximately 1/3 of New York’s children are overweight or obese. School nurses play an important role in providing this information which is used to understand the severity and distribution of obesity among youth of in New York State. BMI data is available by county on the NYSDOH website, and can be used by school districts in developing programs and obtaining grant funding. The School Health Index available on the CDC Coordinated School Health web page provides additional tools to assess school policies and programs which support healthy school environments, reduce risk behaviors and support academic achievement. More information on New York State obesity data can be obtained on the New York Statewide School Health Services website under Data Reporting.
Primary hypertension is not common in children or teenagers, and about half of those diagnosed with hypertension have a hereditary predisposition. For that reason, children born into families with a history of high blood pressure need to have their blood pressure monitored. Other causes have been linked to diet, obesity, and a lack of physical activity, or the result of another disease, like heart or kidney disease- resulting in secondary hypertension. Symptoms a student might share which would indicate further follow up might include dizziness or headache. It is important that nurses monitoring blood pressure in students have the appropriate size equipment for accurate results and use standardized reference charts. A pocket guide for blood pressure measurement in children is available from the National Heart, Lung and Blood institute website and as a reference link below this webinar. Nurses have the knowledge and opportunity to educate students and staff about the importance of “knowing your numbers” as an important personal health practice, as well as providing health messages for maintaining a healthy weight, engaging in aerobic exercise, abstaining from using tobacco or alcohol, and practicing stress management.


Most school nurses will care for a student with a heart condition sometime during their practice. Children may be born with heart disease or may acquire it through illness or injury; however the majority of heart disease in children involves abnormalities in heart structure and function. Heart conditions in children include congenital cardiovascular malformations, acquired heart disease, and cardiomyopathies, congestive heart failure, coronary artery aneurysms, and myocardial infarction. Causes of cardiomyopathies include toxic medications, chronic overload of left ventricular volume from chronic severe valve regurgitation, and myocarditis. Some children with cardiomyopathy are asymptomatic for years, whereas others may develop severe symptoms early in life, including sudden death or life-threatening heart failure.
Congenital heart defects are the most common type of birth defect in the United States, affecting 8 out of 1,000 births. Most defects are mild. Family history of children with a heart defect may increase the risk. Defects are usually, but not always, diagnosed early in life. Advances in medicine and surgery have increased the ability to repair these defects, and has created a growing population of children now entering our primary and secondary school systems with a history of congenital cardiac defects. More than 1 million adults are alive today who had a heart defect repaired during childhood. Many congenital defects result in arrhythmias, some of which may not be identified until tragedy strikes. While practicing as a health care generalist for the healthy school age child, school nurses must also quickly attain the skills necessary to competently deliver care when presented with children having special health care needs. Heart conditions may be one of these specialty areas. In addition to the clinical care school nurses provide to identified students, they also serve an important role as a liaison with the private medical home, as educators in supporting heart healthy practices for students within the school home, and as a support for parents of children with special health care needs. School health professionals are seen as credible messengers for health information, and are ideally positioned to educate staff about the needs of students with cardiac diseases as well as reinforce positive cardiovascular health behaviors which can reduce risk factors for students.
This slide will provide a review of normal heart function and structure. Four main heart valves control direction of blood flow from atrium to ventricles. The tricuspid valve separates the right side atrium and ventricle, and the mitral valve separates the left side atrium and ventricle. The SA node sends electrical impulses from the atrium to the ventricles through a form of ‘junction box’ called the AV node. The blood from the right ventricle goes to the lungs, and the blood from the left ventricle goes to the body. Structure or conduction problems can cause arrhythmia. Arrhythmia can cause sudden cardiac arrest.

Illustrations used with permission: http://en.wikipedia.org/wiki/File:HeartAnatomyDiagram.png
Atrial and ventricular septal defects (ASD or VSD) occur when there is a hole in the wall separating the two upper or lower chambers of the heart. Some require surgical correction, some close on their own. Other serious structural diseases include Tetralogy of Fallot, Transportation of the Great Arteries, and Anomalous Coronary Arteries. These defects while rare in the general population are significant enough to warrant surgical interventions, often during infancy, and might result in restrictions for a child in the school setting as the child gets older; however, as procedures have improved and outcomes are better, some children with history of corrected cardiac anomalies do not have or need any restrictions. Defects in the way the valves are formed can cause the valve to obstruct blood flow (stenosis), or become floppy (prolapse), causing blood to leak backwards. One example school nurses often encounter in adolescents is Mitral Valve Prolapse or MVP. It is the most common heart valve abnormality affecting approximately one in eight otherwise healthy teens and young adults. In most cases MVP does not require restrictions, but can cause discomfort in the chest and even sudden death, though extremely rare. When there prolapse, or obstructed valves, the turbulence creates sounds which can be heard on auscultation. Valvular and septal defects often cause a murmur, clicks, gallops, or other extra sounds. School medical directors should refer any murmur or abnormal rhythm to the private provider to determine whether any further investigation, care, or restrictions are warranted.

Source:
http://www.heart.org/HEARTORG/Conditions/More/CardiovascularConditionsofChildhood/Commonly-Asked-Questions-About-Children-and-Heart-Disease_UCM_311917_Article.jsp
Commotio cordis is a cardiac event that is the leading cause of sudden cardiac death in young athletes. The heart rhythm typically is constant and synchronized in a regular pattern of beats reflecting good pumping action of heart muscle. A blow to the chest at a precise moment of the heart beat causes a “circus pattern” of electrical impulses all over the heart muscle resulting in ventricular fibrillation. The individual may become momentarily confused, then collapse and become apneic, pulseless, cyanotic, and unresponsive. This can result in death if the rhythm is not reversed with an AED within 3 minutes or so. The survival rate is only 3% in cases in which resuscitative efforts were delayed longer than 3 minutes. It is one of the leading cause of sudden cardiac death in young athletes, exceeded only by hypertrophic cardiomyopathy and congenital coronary artery abnormalities. Young athletes are especially at risk because of the pliability of their chest walls. Chest protectors do not seem to afford protection. Although reported in a wide range of ages, it occurs most frequently in males 10-18 years old. It is essential that coaches and other sports personnel are trained in the recognition of this event and the timely response. CPR training and access to AEDs are crucial to achieve this goal.
Cardiomyopathies affect the heart muscle. All causes are not known, but research continues to identify specific genes affecting the structures of the major blood vessels or heart muscle. They affect the pumping function of the heart, either by a thickening or thinning of the heart walls or enlargement of the cardiac chambers, resulting in weakened pumping, stopping or abnormal patterns of the heart rhythm. They may occasionally cause sudden death due to rupture of a major blood vessel such as the aorta. Hypertrophic Cardiomyopathy or HCM, causes thickening of the heart wall. Marfan’s Syndrome is a genetic disorder of the connective tissue that can affect the skeleton, eyes, heart and blood vessels. It affects one in every 5,000-10,000 people. Problems from enlargement of the aorta in children or teenagers are very rare, but 60 to 80 percent of adults with Marfan’s Syndrome will develop enlargement of the first portion of the aorta. Causes of secondary cardiomyopathies include toxic medications, severe valve stenosis, and myocarditis, an inflammatory process primarily caused in children by infectious agents. In children it is usually caused by viral infections that reach the heart, such as the influenza (flu) virus, Coxsackie virus, and adenovirus. However, it may also occur during or after other viral or bacterial infections such as rubella and Lyme disease, and others. Some children with cardiomyopathy are asymptomatic for years, whereas others may develop severe symptoms, including sudden death or life-threatening heart failure. A good interval health history prior to recertification for sports that discloses chest pain, dizziness, fainting, or severe shortness of breath on or shortly after exertion can lead a school nurse to refer a student athlete to the primary provider for further evaluation to rule out cardiac disease and could save a child’s life.

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<td>• Myocardium dysfunction can be caused by:</td>
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<td>• Hypertrophic Cardiomyopathy (HCM)</td>
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<td>o Marfan’s Syndrome may cause aortic aneurysm</td>
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Sudden cardiac arrest is a rare condition in children. It is the abrupt loss of heart function in a person who may or may not have diagnosed heart disease. It occurs instantly or shortly after symptoms appear. It can be successfully treated in many victims by an electrical shock using an automated external defibrillator (AED), but time is critical. Using AEDs helps save lives because they can help restore normal heart rhythm before emergency personnel arrive. Victims always lose consciousness and SCA results in sudden cardiac death if CPR and Automatic Electrical Defibrillation are not initiated. The most common arrhythmia in cardiac arrest is ventricular fibrillation. This is when the heart's lower chambers suddenly start beating chaotically and don't pump blood effectively. Death occurs within minutes after the heart stops. Some arrhythmia conditions related to cardiomyopathy can increase the risk of SCA.
Sudden cardiac death is most often the first clinical manifestation of an underlying cardiovascular disease and usually occurs in previously asymptomatic individuals. It affects us with shock and disbelief. Children and young people who experience sudden cardiac death usually appear healthy and normal—until they have an episode. Up to 95% of deaths are due to disease that causes abnormality of the structure of the heart resulting in an abnormality of the heart’s electrical system, causing sudden loss of consciousness, arrhythmia, and sudden death. Early detection is possible, conditions are treatable and lives can be saved. While SCD can affect anyone, competitive sports are associated with an increased risk in susceptible adolescents and young adults with underlying cardiovascular disorders. Most cardiac arrhythmias and structural defects that may cause sudden death in 12 of every 5,000 young people are identifiable and treatable, leading to normal life spans and lifestyles. It is estimated that early cardiopulmonary resuscitation and widespread availability of automatic external defibrillators could prevent about a quarter of pediatric sudden deaths.
Sudden cardiac death is a rare event in athletics. Most afflicted athletes have no symptoms before death. Many attempts have been made to detect those at risk for sudden cardiac death before athletic participation. At this time, a thorough history and physical examination are the most efficient screening methods for detecting cardiovascular abnormalities. Studies show that the current status of pre-participation cardiovascular screening of high school and college athletes nationwide is inconsistent and is not standardized. The true prevalence for Sudden Cardiac Death (SCD) in children and adolescents is difficult to ascertain because of current data collection standards.
The most common cause of sudden death due to cardiomyopathy in young people under age 30 is Hypertrophic Cardiomyopathy (HCM) which causes abnormal thickening or disruption of the muscles of the walls of the heart. Most people with HCM have a low risk for sudden cardiac death. The condition is usually passed down through families. It is frequently difficult to identify those at high-risk even with a good physical examination. The best screening tool in the school setting is a history of symptoms such as chest pain, dizziness, fainting, or severe shortness of breath on or after exertion, though these can be negative until the first time the student athlete falls victim to the disease. HCM cannot be cured, but it can be managed. Prompt recognition and action with an AED on the field can prevent death in some young athletes. An implantable defibrillator should be used for those with high risk of SCD. Younger people are likely to have a more severe form of hypertrophic cardiomyopathy. However, the condition is seen in people of all ages.
Diseases of electrical conduction can cause a misfiring of heart impulses that can lead to insufficient pumping action. One example is Wolff-Parkinson-White Syndrome (WPW), a conduction disease which includes abnormalities in the way that the electrical impulses are conducted through the AV node due to disease or abnormally placed 'accessory' pathways. Many people with WPW syndrome don't have symptoms, but are at risk of sudden cardiac arrest. Often medication can improve this condition. Another example is Prolonged QT syndrome (LQTS), a disorder of the heart's electrical rhythm that can occur in otherwise healthy people. It is caused by an abnormality of microscopic pores in the heart cells called ion channels. It usually affects children or young adults. Studies of otherwise healthy people with LQTS indicate that they had at least one episode of fainting by the age of 10. The majority also had a family member with a long QT interval. People with LQTS may not have any symptoms. People who do have symptoms often exhibit fainting, especially after exertion. Both of these conditions may be inherited. Additional arrhythmias will be explained on the next slide.
Ventricular tachycardia (VT) is a fast heart rate that starts in the ventricles. Ventricular tachycardia is a pulse rate of more than 100 beats per minute, with at least three irregular heartbeats in a row. It may occur with cardiomyopathy, heart failure, myocarditis and valvular heart disease. It can also without heart disease. If the heart rate during a ventricular tachycardia episode is very fast or lasts longer than a few seconds, there may be symptoms such as: angina, fainting, light-headedness, dizziness, palpitations or shortness of breath. Symptoms may start and stop suddenly. In some cases, there are no symptoms. This uncommon but potentially serious condition can be life-threatening, especially in an older adolescent. Tachycardia may last only seconds or for minutes or hours, and, in its worst form, can progress to ventricular fibrillation, a dangerous arrhythmia that requires prompt action with an AED.
Arrhythmias can occur in the presence or absence of cardiomyopathy. They cause the heart rate to be irregular, fast (tachycardia) or slow (bradycardia). The definition of "too fast" usually depends on the person's age and physical activity. Two common types of arrhythmias are called sinus tachycardia and premature beats. Sinus tachycardia is a normal increase in the heart rate. It occurs with fever, excitement and exercise. No treatment is needed. Rarely, disease, such as anemia or increased thyroid activity can cause this fast heart rate. Premature beats or extra beats most often cause irregular heart rhythms. Those that start in the upper chambers (atria) are called premature atrial contractions or PACs, and those that start in the ventricles are called premature ventricle contractions, or PVCs. The feeling that your heart "skipped a beat," is usually from this type of arrhythmia. It is caused by an extra beat that comes sooner than normal and causes the next beat to be more forceful. Premature beats are very common in normal children and teenagers. Usually no cause can be found, and no special treatment is needed. Occasionally premature beats may be caused by disease or injury to the heart. Assessment questions which can be asked by the school health professional in determining referral of students who experience symptoms include those listed on this slide.
Supraventricular tachycardia (SVT) also called paroxysmal supraventricular tachycardia is the most common abnormal tachycardia arrhythmia in children, and, happily, isn't a life-threatening problem for most children and adolescents. Treatment is only considered if episodes are prolonged or frequent, disrupting a child’s ability to function normally. A child with SVT may be aware of the rapid heart rate and share symptoms of palpitations, dizziness, lightheadedness, chest discomfort, upset stomach or weakness. With a medical order, the child may be instructed to try straining (Valsalva), holding their breath, or put ice on the face to slow the heart rate. Most children with SVT can participate in normal activities without restrictions.

Source:http://www.heart.org/HEARTORG/Conditions/More/Cardiac Arrest/htt/HEARTORG/Conditions/More/Cardiac Arrest/Cardiac-Arrest-in-Children-Special-Considerations_UCM_312196_Article.jsp
Atrial fibrillation or AF, is the most common type of arrhythmia. It occurs if rapid, disorganized electrical signals cause the atria to fibrillate, or contract very fast and irregularly. In AF, blood pools in the atria. It isn't pumped completely into the ventricles, and as a result, the heart's upper and lower chambers don't work together as they should. People who have AF may not feel symptoms. However, even when AF isn't noticed, it can increase the risk of stroke. In some people, it can cause chest pain or heart failure, especially if the heart rhythm is very rapid. AF may happen rarely or every now and then, or it may become an ongoing or long-term heart problem that lasts for years.
Bradycardia is an abnormally slow heart rate of less than 60 beats per minute. A normal heartbeat is between 60 and 100 beats per minute. Heart rates as low as 50 beats per minute, can be normal in athletes and other people who are physically active. Can be a form of cardiac arrhythmia, can also occur with toxic levels of certain drugs, or in certain medical illnesses not related to the heart, such as hypothyroidism, hypothermia, very high blood potassium levels, and Lyme disease. Can cause dizziness, weakness, lack of energy or fainting spells.
Arrhythmias may occur at any age. Often parents and children never suspect an arrhythmia and are surprised when a doctor finds one during a routine physical exam. Rhythm abnormalities are usually evaluated much like other health problems. If the genetic test for cardiomyopathy is positive, family members need to be tested. Preventive treatment could avoid life-threatening arrhythmias in affected family members. What parents and children report about their symptoms is very important. Practitioners may ask questions such as:

- Is your child aware of unusual heartbeats?
- Does anything bring on the arrhythmia?
- Is there anything your child or the family can do to make it stop?
- If it's a fast rate, how fast?
- Does your child feel weak, lightheaded or dizzy?
- Has your child ever fainted?
- Do any medicines make arrhythmias worse?
Family history matters when it comes to heart disease. In adults, studies have found that a family history of premature coronary heart disease in a first-degree relative (heart attack, treated angina, percutaneous coronary catheter interventional procedure, coronary artery bypass surgery, stroke, or sudden cardiac death in a parent or sibling before the age of 55 years) is an important independent risk factor for future CVD. Evidence from observational studies strongly supports inclusion of a positive family history of early coronary heart disease in identifying children at risk. While the private health care provider is the primary clinician responsible for obtaining the complete family history, school nurses are often in a unique position to gather information from students, parents and caregivers when they communicate with them regarding school health issues. Some school nurses may have a student in their care for up to 12 years. It provides an opportunity to form relationships which support education and communication.
The professional school nurse or School Medical Director if no nurse is employed, provides management and coordination of health care for students diagnosed with cardiac conditions through development of emergency and individualized health care plans, and plays a key role as communicator and educator in the role of reviewing health information provided by students, parents, staff and health care providers. All students can benefit from the school nurses expertise in practices and knowledge which support heart health. Educating students and parents on the importance of providing accurate information on the pre-participation clearance form or sharing health concerns with school staff is critically important in identifying students who may be at risk or require referral to the private health care provider. If the School Medical Director has delegated review of health forms to the school nurse, it is important to have written parameters for such review in order to refer students and student athletes whose Health Appraisal or clearance form indicates they may have risk factors to their PCP and/or District Medical Director. Awareness of symptoms described in this webinar and the potential conditions that may be present offers an opportunity to educate parents, teachers and coaches. Research review emphasizes that the Pre-Participation Evaluation (PPE) form and up to date physical exam is a critical link in identifying students at risk. Immediate treatment includes cardiopulmonary resuscitation (CPR) and use of defibrillators. That is why prompt action by bystanders is so critical, and why it is so important that more laypersons learn CPR and how to use an automated external defibrillator (AED).
Several years ago, reports of sudden death, heart attack and stroke among children and adults taking stimulants to treat ADHD caused alarm among parents and health care providers about the safety of medications, prompting Canadian health authorities to briefly pull Adderall from the market in 2005. Further research suggested that the risk may only be to children who had underlying heart defects, such as some congenital abnormalities and arrhythmias. The U.S. Food and Drug Administration now requires that ADHD drugs carry a "black box" label warning about potential heart risks. Adderall, for example, now carries the warning: "Sudden death has been reported in association with central nervous system stimulant treatment at usual doses in children and adolescents with structural cardiac abnormalities or other serious heart problems. In 2008, the American Academy of Pediatrics issued a policy statement that routine EKGs prior to starting children and adolescents on ADHD medications was not necessary. Two major recent studies have found no heart risks associated with ADHD medications. In a study published last November in the *New England Journal of Medicine*, researchers concluded that medications such as Ritalin, Adderall and Concerta do not raise the risk of sudden death, heart attack or stroke in children and young adults. The AAP shares the concern of the American Heart Association, AHA about improving the diagnosis of silent but clinically significant cardiac conditions in children and adolescents, and urges additional research into effective methods to detect these conditions and reduce the incidence of SCD.
The level of cardiac screening required before participating in organized sports is currently a topic of debate in the news and medical community. The question surrounding how much cardiac screening young athletes should receive gained additional attention after the death of several student athletes from cardiac related events in early March 2011. In 2007, the American Heart Association (AHA) issued guidelines for cardiac evaluation for students participating in sports. These guidelines include a physical exam and completion of a family history questionnaire. The questionnaire includes questions on family history, fatigue, fainting and chest pain during exercise. AHA guidelines do not recommend EKG screening. The items included on the questionnaire are listed on the following slide. Advocates of EKG screening indicated that many of the types of conditions which may lead to sudden cardiac arrest in children and teens are not detected by the health history, and that EKG’s will save lives. Although cardiovascular pre-participation evaluation offers the potential to identify athletes with life-threatening cardiovascular abnormalities before onset of symptoms and may reduce their risk of SCD, there is a significant debate among cardiologists about efficacy, impact of false-positive results and cost-effectiveness of routine screening. Pre-athletic cardiac screening in young athletes in the United States has not been adopted universally, and current recommended guidelines have limited effect in identifying students at risk for sudden cardiac arrest. The debate is not likely to be resolved soon. At present, parents should educate themselves about the advantages and disadvantages to EKG cardiac screening and discuss any concerns about their child’s risk for sudden cardiac arrest with their family health care provider.
The American Heart Association recommends cardiovascular screening for high school and collegiate athletes which should include a complete and careful evaluation of the athlete’s personal and family history and a physical exam. Screening should be repeated every two years, and a history should be obtained every year. If heart problems are identified or suspected, the athlete should be referred to a cardiologist for further evaluation and treatment guidelines before obtaining clearance for sports participation. The items included in the screening are listed on this slide. There are recommendations in the medical community that these guidelines would make a useful adjunct to any health assessments.
The School Medical Director is responsible for clearance of students to participate in physical activities and sports. They may choose to delegate the review of health appraisals to school nurses. Written guidelines should be provided to the school nurse to assure that there is clear communication of concerns which need to be evaluated by the medical director. The sports appraisal is not simply a procedure to qualify or disqualify a student from participation. It provides an evaluation of the individual’s health and a consideration of his or her functional ability, growth, and maturation. The School Medical Director can provide health counseling designed to prevent injuries and encourage sports participation as an important, health-promoting activity. New York State provides a sample health appraisals, and a pre-participation athletic form within the Health Appraisal Guidelines. The Guidelines are being updated and will be disseminated in 2012. The New York State Education Department Health Appraisals Guidelines indicate areas which should be assessed during the physical exam pertaining to cardiovascular health. The New York State Health Appraisal Guidelines and sample health appraisal forms can be found on this website under ‘H’ for Health Appraisal and also on the Laws and Guidelines Page.
The American Academy of Pediatrics recently endorsed a standardized pre-participation athletic evaluation form. Questions 5 through 16 on this standardized form deal with the issues of cardiovascular risk assessment. Families must understand the importance of obtaining accurate, detailed information as this portion of the form is completed. If the school nurse has been delegated to review this form by the School Medical Director, it is equally important that they look at the information provided and follow up with the parent and School Medical Director regarding potential concerns. Identification of possible cardiovascular risk is not limited to athletic pre-participation. Although many pediatric SCD events are associated with activity, they are not isolated to high school or college athletes. Children of all ages still succumb to pediatric SCD and, likewise, should be screened.
The evaluation of student athletes with symptoms of cardiac arrhythmias, syncope, and family history of sudden death should be referred to the private medical providers. They may determine that the student requires a complete cardiac workup. A list of criteria for referral are listed on this slide.
School health offices are often a place where students turn to for advice. It is important to empower students to share their concerns so that appropriate referrals can be made. Help students to stay safe by thinking SAFE. Remind them to:

- **S**hare any personal and family heart history with their parents, family doctor, school nurse or coach.
- **A**ccount for all symptoms of chest pain, dizziness, fainting or difficulty breathing during or after exercise by telling their parents, family doctor school nurse or coach.
- **F**eel safe by having all symptoms checked out by your health care provider.
- **E**njoy life knowing you made good choices to protect your heart and yourself.

Think **SAFE** to Stay Safe

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Questions about athletic participation in patients with heart problems are frequent. There are a wide variety of cardiac defects, surgical repairs, and athletic activities. The private health care provider or cardiologist will determine any restrictions needed from athletic activities. Most children who have relatively simple cardiac defects, and who have had a good result after catheter or surgical repair can participate in at least some, if not all, athletic activities. Other children may have heart conditions that warrant some restrictions. Patients with pacemakers or implantable cardioverter defibrillators (ICDs) may have additional restrictions. Those taking anticoagulants should check with their medical provider about participation in athletic activities.
Studies have found that coaches, athletic trainers, physical education teachers, and nurses are the most likely first responders to sudden cardiac arrest during the school day and at extracurricular activities. Coaches also have a unique relationship with athletes and may have information not available to other school health staff. The National Standards for Sport Coaches (NASPE, 2006) addresses that responsibility directly, stating that coaches should “Recognize injuries and provide immediate and appropriate care.” The New York State Public High School Athletic Association (NYSPHSAA) believes that proper medical and first aid care shall be provided by school authorities for students engaged in athletics, and recommends that the school district provide all coaches with a plan for emergency medical action. Furthermore, all coaches must be current in meeting first aid and safety skill requirements. Timely access to AEDs at training sporting competitions permits effective management of emergencies. Sudden Cardiac Arrest should be suspected in any collapsed and unresponsive athlete, and an AED applied as soon as possible for rhythm analysis and defibrillation if indicated.
Having an AED with properly trained staff is the most important link in the chain of survival. School administrators can assure that their school is prepared for emergencies by:

- Procuring and placing AEDs as mandated by New York State law incorporating oversight of the PAD program in district and building level emergency response planning.
- Considering the goal of applying defibrillation within three to five minutes of the time of collapse will help in planning for the number and location of AEDs necessary to serve the facility adequately.
- Establishing a communication system to alert the school response team to the location of an emergency, and a process to call 911.
- Ensuring that staff have current certification and are familiar with where the AED is located, as well as its use and emergency procedures. Providing opportunities for practice drills will help to assess the effectiveness of response plans.
- Communicating with your Medical Director on a regular basis to obtain new CPR and AED guidelines and ask questions regarding PAD use and training.
- Updating policies and procedures annually to include a process for routine inspection of the AEDs which includes checking the battery and pads to assure they have not expired. It is important to check AEDs at the start of each athletic event.
- Ensure that identified school personnel practice and review the emergency plan for using an AED through mock-scenario training at the start of each athletic season or at least once annually.
The vital links of the cardiac chain of survival will increase survival rates; early access to 911, early CPR, early defibrillation and early advanced care. For every minute without defibrillation, a victim’s chance for survival decreases by 10 percent. Parents and school personnel are encouraged to check to ensure that their school is ready to help a young person in a cardiac crisis. Sample emergency care plans and individualized health care plans are available in nursing references such as Individualized Healthcare Plans for the School Nurse: Concepts, Framework, Issues and Applications for School Nursing Practice, as well as on-line through websites dedicated to cardiac health. Some of these are listed on the resource slide included in the presentation, and are also included on the page where you launched this webinar.
New York State Education Law Section 917, enacted in May 2002 and Regulations of the Commissioner of Education 136.4 AED’s in the School Setting, address the requirements for on-site cardiac defibrillators and the provision of trained staff to operate them. They apply to public school districts, BOCES, county vocational education and extension boards and charter schools. Section 3000 a of NYS Public Health Law provides protection for any person who voluntarily renders first aid or emergency treatment to a person who is unconscious, ill, or injured. Public Access Defibrillation Program or (PAD) requirements detail what is required to purchase, acquire, possess and operate an automated external defibrillator pursuant to a collaborative agreement with an emergency health care provider. These requirements and additional information on AED’s can be found on the Student Support Services page of the New York State Education website.
Section 3000-b, Paragraph 3 (f) of Public Health law addresses signage requirements:

- The public access defibrillation provider shall post a sign or notice at the main entrance to the facility or building in which the automated external defibrillator is stored, indicating the location where any such automated external defibrillator is stored or maintained in such building or facility on a regular basis.

Section 3000-b, Paragraph 3 f of Public Health law addresses signage to identify the location of the AED. In addition, The Safe Schools Against Violence in Education Act (SAVE) signed into law by in 2000, mandates that every Board of Education, BOCES, County Vocational Education and Extension Board and the Chancellor of the New York City School District adopt a District-wide School Safety Plan, and Building-level Emergency Response Plan for each building in the districts. Knowing the location of the AED and practicing drills which include the AED are an important part of emergency planning.
A research study of 1,710 US high schools with at least 1 onsite AED were identified from the National Registry for AED Use in Sports between December 2006 and July 2007. Although 83% of schools had an established emergency response plan for Sudden Cardiac Arrest, SCA, only 40% practice and review the plan at least annually with potential school responders. 36 cases of SCA were reported in the 1710 schools. Twenty-three SCA victims survived to hospital discharge, including 9 of the 14 student athletes and 14 of the 22 older nonstudents. School-based AED programs provide a high survival rate for both student athletes and older nonstudents who suffer SCA on school grounds. High schools are strongly encouraged to implement onsite AED programs as part of a comprehensive emergency response plan to SCA.
The most important part of the Public Access Defibrillation Program is the public. The AED unit is useless without someone who is trained to use it. While the School Nurse is the primary health resource within the school and the most qualified to respond to an emergency, they cannot be the only one with training in the building. They are however in a position to encourage building staff to take advantage of opportunities for obtaining CPR/AED certification. Certification may be obtained through approved providers. The duration of this certification varies from provider to provider and is generally one or two years. In 2010, the American Heart Association released updated Guidelines for CPR that affect all rescuers. The updated AHA guidelines recommend a change in the sequence of steps from A-B-C (Airway, Breathing, Chest compressions) to C-A-B (Chest compressions, Airway, Breathing) for adults, children, and infants. Immediate recognition of cardiac arrest, activation of the emergency response system, early CPR with an emphasis on chest compressions, and rapid defibrillation are essential components of the chain of survival. To this end the American Heart Association supports multiple education initiatives to increase the number of persons who know how to perform CPR, including a current NY initiative to pass legislation that would allow all students to learn CPR and how to use an AED before they graduate high school. As licensed health care professionals, it is important to stay current in the most updated standards of care for emergency response and obtain training needed for professional practice.
The organizations listed on this slide offer many free resources which may be used by school nurses in educating themselves and others, and providing care for students with identified cardiac concerns. They include sample assessment forms, emergency and individualized health plans, parent and staff educational materials, posters and checklists for evaluating your districts CPR/AED status. These resources are also included as a link on the webinar page.

Allison’s Heart Foundation-http://www.stopcardiacarrest.org
American Heart Association – http://www.heart.org
Centers for Disease Control and Prevention- http://www.cdc.gov
Children’s Cardiomyopathy Foundation – http://www.childrenscardiomyopathy.org/
National Heart, Blood and Lung Institute National Heart, Blood and Lung Institute–
New York State Education Department– www.nysed.gov
New York State Health Department –www.health.ny.gov
Parent Heart Watch – http://www.parentheartwatch.org/
Sudden Arrhythmia Death Syndromes - http://www.sads.org/
Sudden Cardiac Arrest Coalition - http://www.stopcardiacarrest.org/