PREPARE

BECAUSE THE UNEXPECTED HAPPENS

NATIONAL CENTER FOR NCSS SPORTS SAFETY

GHSA

GEORGIA HIGH SCHOOL ASSOCIATION SPORTS SAFETY CURRICULUM

EIGHTH EDITION

LETTER FROM THE FOUNDER

Dear **PREPARE** Participant,

Thank you for choosing the National Center for Sports Safety **PREPARE** course to learn vital sports safety, injury prevention and emergency recognition techniques. This course will provide you with important information on how to care for injured athletes, and more importantly, how to prevent injuries from occurring.

As a sports medicine orthopedic surgeon for over 40 years, I have cared for thousands of injured athletes. We all understand that injuries are a risk we take when playing sports, but it is always particularly devastating to treat an athlete with an injury that could have been prevented. With this in mind, the National Center for Sports Safety (NCSS) was founded to promote the importance of injury prevention and safety on all levels of youth sports through education and research.

In the summer of 2002, the National Center for Sports Safety gathered the nation's leading medical, safety and curriculum experts and members of top sports organizations to assist in the development of this course. The "Setting the Standard" Summit was a great success! Utilizing the expertise of the representatives, we developed what I believe to be the most important course a coach can take to prepare for the upcoming season. I appreciate the sincere volunteerism that has been provided by all of our Delegates, who bi-annually provide updates to this course and the NCSS content.

The **PREPARE** course will give you a detailed guide of basic sports safety and emergency recognition with response skills. Please pay close attention to the topics presented in this course. The safety and well-being of your athletes depend on it.

Since 2009, the NCSS has worked to provide further tools and resources for youth coaches, parents, and athletes. The policies and procedures tool, the sports nutrition and hydration interactive program, the parent and athlete video, the 1st responder course for equipment removal, and the emergency action planning online wizard, are all part of the NCSS's continued effort to help create a safe playing environment for America's youth athletes. To learn more about these recent programs, please visit the NCSS website at www.SportsSafety.org.

I hope you find the **PREPARE** course valuable in your interactions with your athletes, both on the field and off the field. Remember, being aware and being prepared can lower the risk of injury!

Sincerely,

Lawrence J. Lemak, M.D.

Founder of the NCSS

"There is not one parent who would drop their child off at a local pool if there were not a certified lifeguard on duty. That same standard of care should be available for every sports facility in this country."

- Dr. Lawrence Lemak, 2001

MISSION STATEMENT

The National Center for Sports Safety (NCSS) was founded to promote the importance of injury prevention and safety on all levels of youth sports through education and research. The National Center for Sports Safety focuses on decreasing the

number and/or severity of injuries among athletes by developing and teaching sports safety courses as well as researching and analyzing injury data.

ABOUT THE FOUNDER

LAWRENCE J. LEMAK, M.D.

Renowned orthopaedic surgeon, Lawrence J. Lemak, M.D., founder of the NCSS, has been involved in sports medicine for over 40 years. He is a founding partner of Lemak Sports Medicine & Orthopedics, one of the nation's leading orthopaedic clinics. Dr. Lemak has played an integral role in sports medicine and arthroscopy research as one of the founders and Board of Directors for the American Sports Medicine Institute.

Dr. Lemak is a graduate of The University of Alabama at Birmingham Medical School, and completed his orthopaedic residency at The University of Pittsburgh. He specializes in sports medicine, arthroscopy, and reconstruction of the knee, shoulder, hip, and elbow. As a leader in the field of arthroscopy, Dr. Lemak has published articles in medical journals and has given presentations in the United States, England, Europe, Japan and South America.

Many professional sports organizations and corporations call upon Dr. Lemak's expertise as he serves as the Medical Director for Major League Soccer, NFL Europe, the Professional Golf Association and the Ladies Professional Golf Association, and the United Football League. He is also on the medical advisory boards for the National Federation of High Schools, the Alabama High School Athletic Association, and

Pop Warner Little Scholars. In addition, he is also Team Physician for many colleges, universities, and high schools throughout the Southeast.

He is a member of the American Academy of Orthopaedic Surgeons, Arthroscopy Association of North America, and American Orthopaedic Society for Sports Medicine, among others. He also serves as the Clinical Assistant Professor at The University

of Alabama at Birmingham and The University of Virginia. Dr. Lemak also served as Interim Chairman of Orthopaedics at The University of South Florida in Tampa from 2004 to 2006.

Although he spends much of his time with collegiate and professional athletes, Dr. Lemak remains dedicated to improving care for high school, youth, and recreational athletes. He feels by implementing the education process, the number and severity of injuries can be significantly decreased.

TABLE OFCONTENTS

2018 Manual Reviewed & Updated By

Joe Hacker, MEd, ATC, CSCS - Regional Athletic Training Coordinator, Drayer Physical Therapy Institute

Brad Yeargin, MEd, ATC, CES - Regional Athletic Training Coordinator, Drayer Physical Therapy Institute

Daniel McAdams, MS, ATC - Regional Athletic Training Coordinator, Drayer Physical Therapy Institute

Special thanks to Drayer Physical Therapy Institute

WAIVER OF LIABILITY

The NCSS and contributors to the **PREPARE** program shall not be directly or indirectly liable in any way to participants for utilization of and/or participation in the **PREPARE** program and/or the course materials. The NCSS shall not be liable for injuries to athletes or others who are the recipients of **PREPARE** materials and/or recommendations or who participate in activities using the **PREPARE** program. The **PREPARE** program is merely a guide to assist in injury prevention and emergency treatment for youth athletes. The information contained in the PREPARE program materials is obtained from various sources, and neither the NCSS or the contributors guarantee that such information is complete, accurate, or up-to-date.

The NCSS makes no representations or warranties as to the quality, accuracy, or completeness of any information contained in the information provided in **PREPARE** or any other NCSS work product, documents, or publications. The information provided in the **PREPARE** program may become outdated over time. The NCSS undertakes no obligation to correct or update any information provided in the **PREPARE** program lectures, workshops, or materials. The NCSS may make improvements and/or changes in the **PREPARE** program and in the program materials without notice and reserves the right to alter or delete information in the materials at any time. The materials are provided on an "As Is" basis. The NCSS expressly disclaims all warranties of any kind, whether express or implied, including, but not limited to, the warranties of merchantability and fitness for a particular purpose. The NCSS nor the contributors to the **PREPARE** program shall be liable for any damages (special, consequential, incidental, or punitive), directly or indirectly, that result from your use of and/or participation in the **PREPARE** program.

DISCLAIMER

Information contained in the PREPARE program materials is not a substitute for professional medical advice, health care services, or a medical exam. Only an athlete's doctor or qualified medical professional can provide you with advice or recommendations for an athlete's individual condition, ailment, treatment, or problem.

MODULE 1

PREPARING FOR THE UNEXPECTED

ARE YOU PREPARED?

INTRODUCTION

In the event of an emergency, having a plan is an important part of being prepared. This takes shape in what is called an Emergency Action Plan (EAP).

PURPOSE - The purpose of an Emergency Action Plan (EAP) is to outline, in writing, the actions that will occur should an emergency arise. It indicates specific responsibilities for coaches and other individuals in order to obtain advanced medical care for an injured athlete or spectator. An EAP should include facility specifics, plans for sudden cardiac arrest, weather related situations, and non-emergency and emergency situations.

It's essential that all facility staff, coaches, and parents of players are aware of the emergency action plan and its components.

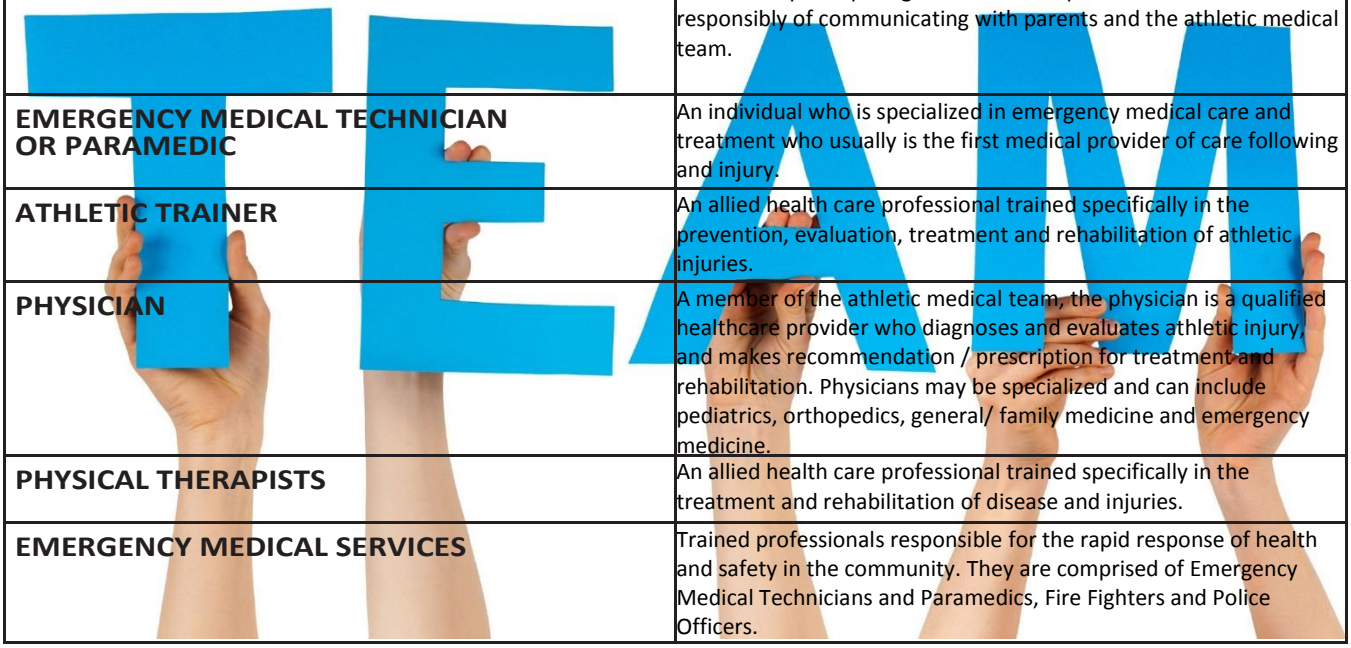
TIME-OUT!

EAP STANDS FOR: EMERGENCY ACTION PLAN

THE ATHLETIC TEAM

Know Your Resources

ATHLETE	The individual participating in athletics. This person is responsible for their own health and well-being, unless she/she is under the age of 18 (in which case the person responsible is a parent or legal guardian.)
PARENT AND/OR GUARDIAN	Legally responsible for athletes under the age of 18, parents and/or guardians are responsible for attaining a pre-participation examination (PPE) prior to athletic participation, be aware of signs and symptoms of athletic injury and communicate and follow-up with members of the athletic health team.
COACH	The individual teaching and supervising athletic participation. These individuals are responsible for the health, welfare and well being of the athlete participating in the desired sport. This individual has the responsibly of communicating with parents and the athletic medical team.
EMERGENCY MEDICAL TECHNICIAN OR PARAMEDIC	An individual who is specialized in emergency medical care and treatment who usually is the first medical provider of care following and injury.
ATHLETIC TRAINER	An allied health care professional trained specifically in the prevention, evaluation, treatment and rehabilitation of athletic injuries.
PHYSICIAN	A member of the athletic medical team, the physician is a qualified healthcare provider who diagnoses and evaluates athletic injury, and makes recommendation / prescription for treatment and rehabilitation. Physicians may be specialized and can include pediatrics, orthopedics, general/ family medicine and emergency medicine.
PHYSICAL THERAPISTS	An allied health care professional trained specifically in the treatment and rehabilitation of disease and injuries.
EMERGENCY MEDICAL SERVICES	Trained professionals responsible for the rapid response of health and safety in the community. They are comprised of Emergency Medical Technicians and Paramedics, Fire Fighters and Police Officers.



Survey your parents to know if someone is a physician, nurse, athletic trainer, first responder, or EMT. These individuals can be of assistance in an emergency situation.

EMERGENCY ACTION PLAN

An Emergency Action Plan should be:

- Developed in conjunction with the organization's administrative staff, coaches and local emergency medical personnel.
- Written and delivered to the entire athletic team (see above chart).
- Venue/facility specific.
- Communicated to the appropriate individuals, rehearsed and reviewed frequently. (The EAP should be reviewed a minimum of once per year.)
- Communicated to all parents during a pre-season meeting.

RESPOSIBILITIES

The Emergency Action Plan should clearly indicate the responsibilities of each individual involved in the plan. Areas to address may include:

Who will…

- Make the call to 911?
- Stay with the athlete?
- Contact the parents?
- Call absent parents if a child needs to go to the hospital?
- Meet the ambulance?
- Unlock the gate/door?
- Get the medical records of the athlete?
- Control the scene?

PHONE AVAILABILITY

- Will a mobile phone be used?
  - Do you have service?
- Where is the nearest land-line phone?
- Program emergency phone numbers into mobile phones. Use 911 if available.
- Emergency phone numbers should be posted by the phone and readily available in the first aid kit and Automatic External Defibrillator (AED).
- There should be an alternative phone plan in case the primary plan fails.
- A list of administrators and others who should be notified in case of emergency should be on hand.

COMMUNICATION

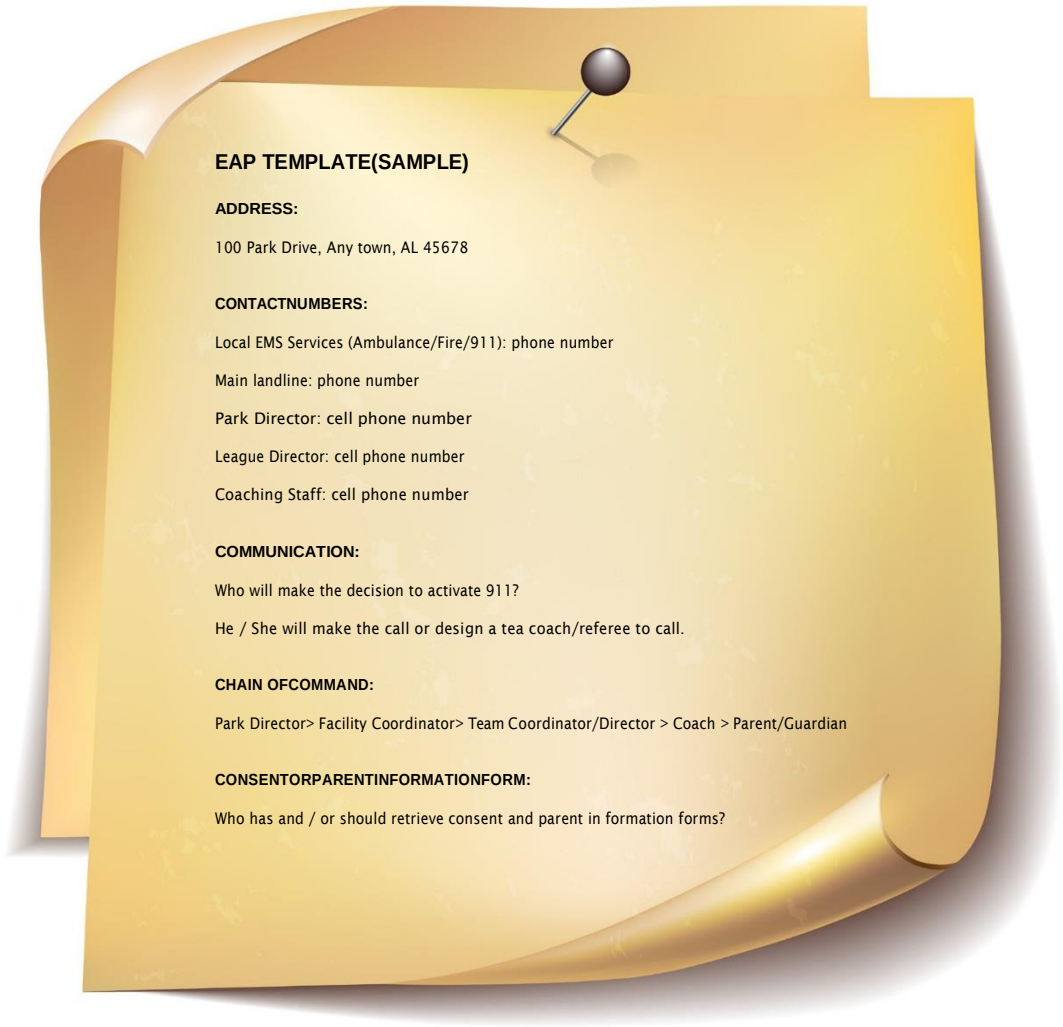
- Prior to each season, supervisors of athletic venues should visit local emergency care facilities to become familiar with their personnel, policies and procedures.
- To authorize emergency care, a medical release, permission to treat, and permission to transport form for each player should be signed and kept on file, along with any known allergies or medical alerting conditions (asthma, sickle cell, etc.).
- Emergency Medical Service (EMS) is comprised of ambulance, fire, or police services. Meet with your local EMS so they can pre-plan a response for your location.
- It is important to have contact information on all players, including their parents' cell phone and home phone numbers as well as the medical history on each athlete.

WHEN 911 IS CALLED

Be prepared to give the following information:

- Your name, address of current location and phone number
- Suspected injury/symptoms. i.e. athlete has a dislocated ankle
- Number of injured individuals
- Condition of athlete, i.e. athlete is conscious and talking
- Current assistance being given to athlete, i.e. coach is splinting and stabilizing the ankle
- Specific venue
- Entrance that is available
- Other information as requested by the 911 operator. Be prepared to stay on the line with the 911 operator until help arrives. Do not hang up until instructed to do so.

Assign Responsibilities | Communicate - 9-1-1 | Be Prepared. Safety First.



EAP TEMPLATE(SAMPLE)

ADDRESS:

100 Park Drive, Any town, AL 45678

CONTACTNUMBERS:

Local EMS Services (Ambulance/Fire/911): phone number

Main landline: phone number

Park Director: cell phone number

League Director: cell phone number

Coaching Staff: cell phone number

COMMUNICATION:

Who will make the decision to activate 911?

He / She will make the call or design a tea coach/referee to call.

CHAIN OFCOMMAND:

Park Director> Facility Coordinator> Team Coordinator/Director > Coach > Parent/Guardian

CONSENTORPARENTINFORMATIONFORM:

Who has and / or should retrieve consent and parent in formation forms?

EMERGENCY TRAINING

- Each person responsible for the health and welfare of athletes should be able to recognize life- threatening situations.
- The primary concern is to maintain circulation, airway and breathing (CAB) until professional help arrives.
- Those certified should be prepared to administer CPR if needed.
- It is also recommended that individuals be certified to use AEDs. AEDs should be applied within three minutes of the incident. (Know where the AED is located and make sure to have access.)

SCENE MANAGEMENT

Many times in an emergency situation, too many individuals surround the scene. Someone should be assigned to do the following:

1. Direct EMS
2. Control the area around the injured athlete
3. Keep other athletes and spectators away from the injured person

Important parts of the implementation of an emergency action plan include:

- Meet regularly with the local EMS to make any necessary changes in your Emergency Action Plan.
- Regularly review and rehearse the plan with all volunteers and staff.
- Communicate during an emergency.
- Make sure all staff members are currently certified in CPR, AED training and the NCSS PREPARE course.

FIRST-AID KIT AND EMERGENCY EQUIPMENT

- The proper individuals should know the exact location of the equipment or keep it with them at all times.
- First Aid Kit and emergency equipment should be stored in a dry environment.
- These should be checked on a regular basis to make sure all supplies and equipment are available and in working order. Used and/or expired items should be replaced.
- Medical history/information and medical release forms for all players should be immediately available for use in an emergency situation, especially to provide information to 911. (i.e. if a child has asthma).
- Accurate health information on each athlete should be updated yearly.

The following items should be included in your first aid kit:

- Gloves
- Ice bags
- Gauze
- Cotton Swabs
- Contact solution
- Antibiotic ointment
- Alcohol wipes
- Hydrocortisone cream
- Insect repellant
- Tape cutter
- Athletic tape
- Hand sanitizer
- Towel
- Trash Bag
- Pen/Permanent Marker
- CPR mask/face shield
- Bandage strips (assorted sizes)
- Elastic wraps (assorted sizes)
- Eyewash
- Adhesive tape
- Antiseptic wipes
- Insect sting ointment
- Sun block
- Scissors
- Wound cleaner
- Emergency information cards
- Tools for facemask removal
- Biohazard Bags
- Note Pad

The NCSS has first aid kits with supplies for sale. If your organization needs a kit, contact the NCSS for additional information.

AUTOMATED EXTERNAL DEFIBRILLATORS (AEDS)

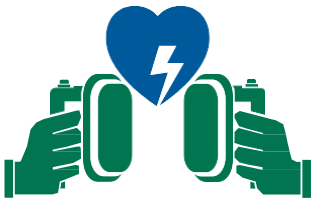
- Sudden Cardiac Death (SCA) is the leading cause of death in the United States, effecting approximately 300,000 people each year.

- Sudden Cardiac Death is the leading cause of death amongst athletes.
    - 13 Heart Related Deaths/33 Deaths (2013)

    - 25 Heart Related Deaths/34 Deaths (2012)

- An AED should be applied to an individual within minutes after the athlete needs it (collapse/drop-to-shock is 3-5 minutes). Every minute after 3 minutes is equated to a 7%-10% increase in risk.

- Expiration date on pads and battery should be checked and documented regularly.



TIME-OUT!

Automated External Defibrillator (AED)

Automated External Defibrillators (AEDs) deliver an electrical shock to the heart. The AED determines if a shock is needed and administers the shock indicated.

AEDs are commonly found in public places such as airports, airplanes, malls, fitness facilities, schools, and sporting arenas.

LIGHTNING PRECAUTIONS

OVERVIEW

- Establish a chain of command that identifies who is to make the call to remove individuals from the field.
- Have a means of monitoring local weather forecasts and warnings before and during practices/games.
- Designate a safe shelter for each sports arena.
- Use **"When Thunder Roars, Go Indoors."** To help determine when you need to take cover.
- Once activities have been suspended, wait at least 30 minutes following the last sounds of thunder before resuming activity or returning outdoors.
- Decide who makes the call to cancel games and who is the lightning detector.
- Avoid being at the highest point in an open field, in contact with, or in proximity to the highest point, or on/ near water. Do not take shelter under or near trees, flagpoles, or light poles.

MANAGEMENT OF LIGHTNING INJURY

- Survey the scene for safety.
- Activate local EMS.
- Touch a lightning victim to see if he responds. The person will NOT "carry a charge."
- If necessary, move the victim, with care, to a safer location.
- Evaluate circulation, airway, and breathing and begin CPR if necessary.

AWAY GAMES

- When you travel to other arenas or facilities, never assume that they will have a prepared Emergency Action Plan.
    - If facility does have an EAP, take time to become familiar with their plan.

- If no Emergency Action Plan exists, obtain the necessary emergency telephone numbers, secure a mobile phone or identify a working and accessible alternate telephone.
    - Become aware of the home team's first aid kit and AED location.
    - If possible, travel with your teams first aid kit, necessary emergency medical paperwork, and waivers.

QUESTIONS TO CONSIDER:

- Do we have a physician, nurse, or athletic trainer on hand?
- Do I have a mobile phone?
    - Is the battery charged?
    - Are the emergency numbers programmed in or do I need them written down?
- If a mobile phone is not available…
    - Which phone will use?
    - Where is it located?
    - Does it work?
    - How accessible is it? Is it behind a door that could be locked?
    - Are emergency numbers posted by it or do I need them written down?

EQUIPMENT:

- Is the first aid kit properly stocked with all needed items?
- Is the battery in the AED fully charged?
- Is the AED kit properly stocked with a towel, razor, and scissors?

SUMMARY

- The emergency Action plan (EAP) is a critical part of the total sports/athletic program.
- Make sure your EAP is thorough and comprehensive and can be applicable during injuries (non-emergency and emergencies) as well as weather related events.
- The EAP should be updated early, prior to the start of official practices and competitions.
- Regular training and practice of the EAP will ensure all staff and coaches are aware of the responsibilities needed during its actual use.
- Incorporating first-aid and AED training/reviews before the start of the year, and throughout the year helps everyone become more confident.
- EMS personnel should be involved in the implementation and regular training of the EAP.
- It is essential that all facility staff, league administrators, coaches, players and parents be aware of the EAP and know their pre-designated role.
- When traveling to a team site, become familiar with their EAP, means of communication and facility.
- Before practice and competition, ensure that your first-aid kit and AED are in proper working order/condition and fully stocked.
- Keeping first-aid kit and AED from the elements (weather) will preserve them longer.

MODULE 2

ENVIRONMENTAL CONCERNS AND HYDRATION IN ATHLETICS

INTRODUCTION

Environmental factors can affect the health and safety of those athletes in both indoor and outdoor based sports. While we cannot necessarily control these extrinsic factors (lightning, tornados, hot and cold temperatures), with proper planning, following guidelines, and recommendations for athletic participation in these environments, monitoring changes in those involved in sports, signs and symptoms awareness, and bringing education and awareness to all those involved in athletics can reduce injuries caused by environmental factors and concerns.

Monitoring Changes in Weather

- Climatic weather patterns can change abruptly. Someone should be assigned to monitor the weather before, during and after practice and competition.
- Many resources are available to monitor these changes:
  - The National Weather Service (NWS)
  - National Oceanic and Atmospheric Administration (NOAA)
  - Television
  - Internet
  - Radio (NOAA & public/private radio stations)
  - News papers
  - Smart Phone applications (apps)

What is the Difference between a Watch and Warning?

- Severe weather is commonly associated with rain, hail, lightning, flash floods and tornados.
- When the National Weather Services (NWS) issues a:
  - **Watch**- the risk of a hazardous weather event is significantly increased, but its presence, location, or timing is unclear; the purpose it to provide enough time to set plans in motion. When a Watch is issued, your EAP should be set and be ready to be put into motion.
  - **Warning**- the risk of hazardous weather (i.e. conditions posing a threat to life or property, is occurring, is imminent, or has a very high probability of occurring).
  - When a Warning is issued, your EAP should be activated.

Seeking Safe Shelter

- It is important to designate a safe shelter prior to activity.
- Considerations should include:
- How far is the designated safe shelter from your location?
- How long will it take for everyone to seek the safe shelter (athletes, spectators, officials and administrators)?
- How many can it hold?
- Are there multiple safe shelters?
- Are there different shelters for different weather patterns? (lightning vs. tornado)
- What supplies/resources are available for those in this shelter? (weather radio, extra batteries, flash lights, etc)
- Someone should always be in charge of monitoring the weather.
- Weather radios and/or lightning detectors are recommended.
- Do not wait until the last minute to seek cover. Weather conditions change rapidly.
- In the event of a tornado, or severe thunderstorm, suitable accommodations must be identified to

house players and spectators. Your local EMS should be able to help you with this part of the plan.
- Officials must decide how they will communicate the evacuation procedure to spectators.
- Even though officials usually make the final ruling for severe weather, it is imperative that ADs and coaches voice any concerns for safety to the officials.

- In the event of thunderstorm and tornado, safe shelter must be identified to house players, spectators, officials and league administration.
- Do not wait to seek safe shelter in the event of the following:
  - Hail, Lightning, and Thunderstorms
    - The Safe Shelter should be:
      - A substantial, fully enclosed building with wiring, and plumbing, such as a school, field house, library, home or similar habitable building. Avoid standing next to windows.
      - A fully enclosed metal vehicle such as buses, cars, and vans are also safe shelters.
    - Inappropriate shelters:
      - Open picnic and park areas
      - Non-metal and/or soft top fully enclosed cars, buses and vans
      - Storage sheds
      - Open areas such as tents, dugouts, refreshment stands, gazebos, screened in porches, press boxes and open garages
      - Under tall objects (trees, flag poles, light poles)
      - Bodies of water:
        - Pools & spa tubs (outdoor and indoor)
        - Showers
- Tornados
  - The Safe Shelter should be:
    - A permanent building/structure
    - Basements
    - Interior hallways of the lowest floor, and avoid rooms with windows
    - As a last resort, move/drive away from the impending storm
  - Inappropriate shelters:
    - Open fields
    - Mobile homes/trailers/sheds
    - Rooms with windows

Communication

- Though officials usually make the final ruling for severe weather, it is imperative that facility and league officials communicate effectively prior to the start of practice/competition regarding the EAP for incoming weather/changes in weather.
- League officials and administrators must be able to effectively communicate with game officials, teams and spectators evacuation procedures and safe shelter locations (public-address system, text messaging, phone, 2-way radios, and posted signage at facilities, etc.).
- Leagues have a responsibility to inform the public, and communicate appropriate and inappropriate safe shelters.

Monitor the Weather

Lightning Overview

- Lightning causes approximately 55-60-fatalities and 400-injuries each year
- The highest number of lightning causalities are reported during recreational and sporting activities
- A majority of lightning victims were traveling to a safe shelter when they were struck
- 90% of lightning causalities occur from May to September
- Is most common during the summer afternoon and evening
- There is no safe place, outdoors, during a thunderstorm/lightning
- Lightning can strike upwards of 7-10-miles away
- It does not need to be presently raining for lightning to occur
- Make sure to understand common weather patterns as they affect your athletic facilities

Monitoring Lightning

- Utilize multiple resources (NWS, NOAA, local media, cell phone applications, etc.) to monitor incoming weather in order to make the best decisions.
- In the past, many used the Flash-to Bang method to determine the distance of incoming weather to make their sole decision.
- With advances of technology, and with the difficultly to see lightning 7-10 miles away, the National Weather Services has moved away from Flash-to-Bang, and adopted the slogan, 'When thunder Roars….Go Indoors' (i.e.- when you hear thunder, lightning is close enough to strike).
- Athletic participants may resume activity 30-minutes following the last strike of lightning (at least 10 miles away) AND the last rumble of thunder is heard.

Management of a Lightning Struck Victim

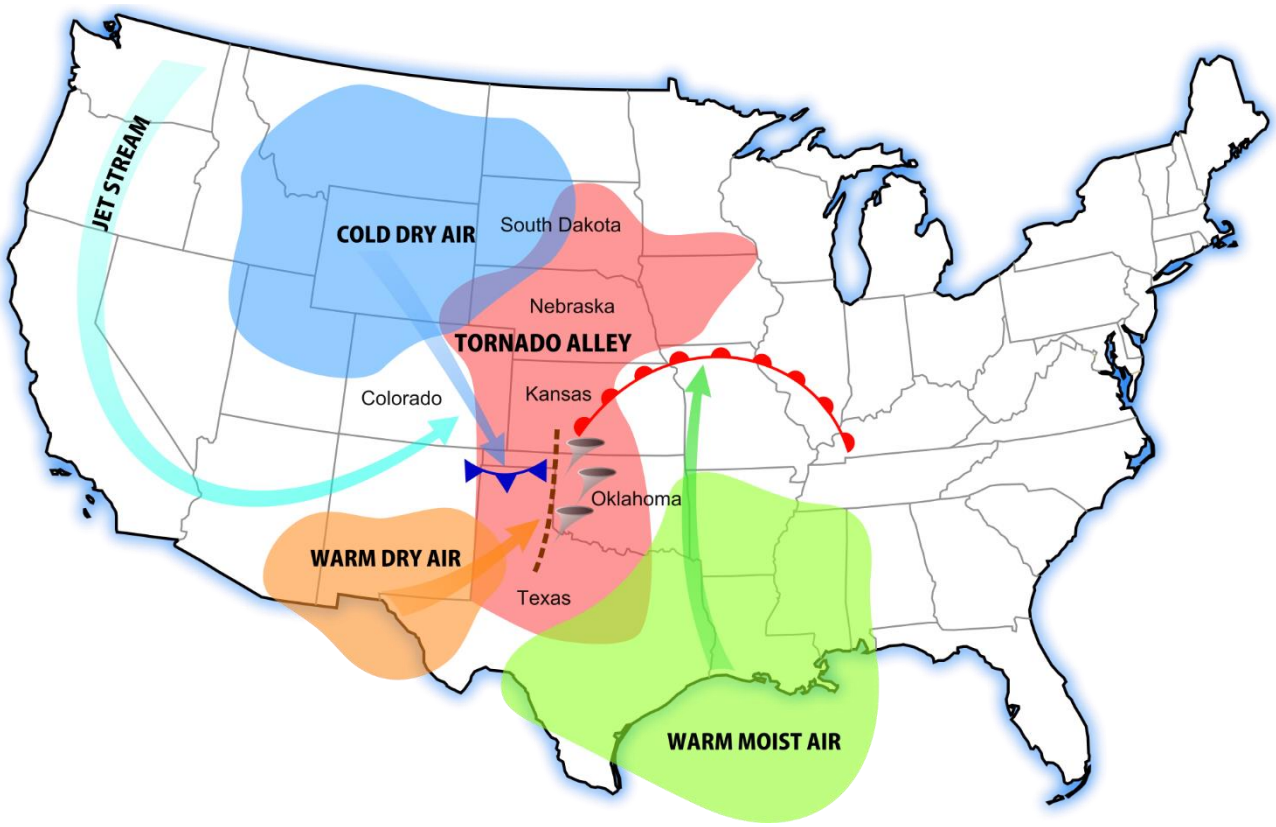
- Survey the scene for safety.
- Activate local EMS.
- Touch a lightning victim to see if he responds. The person will NOT "carry a charge."
- If necessary, move the victim, with care, to a safer location.
- Evaluate circulation, airway, and breathing and begin CPR if necessary.

Your EAP for Lightning/Severe Thunderstorms/ Hail should include:

- Identify resources and local sources for monitoring incoming weather.
- Identify appropriate safe shelter locations from your athletic facility.
- Identify appropriate time for everyone to seek safe shelter.
- Ensure your facility has appropriate resources available.
- It is critical to establish and have effective means of communication with athletes, coaches, officials, spectators and league officials in the event of inclement weather.

Tornado Overview

- Aid supplies, emergency equipment, bathrooms, etc.)
- Tornados can occur at any time of the day throughout the year.
- An average of 1,200 tornadoes occur in the United States each year, accounting for 60-65 fatalities and more than 1,500 injuries.
- Excluding Alaska, tornadoes have occurred in every state throughout the United States.
- Tornado activity is more common in tornado alley (the region in central Texas, westwards towards eastern Colorado, northward towards northern Nebraska and Iowa, eastwards of Ohio, and extending southward to Florida).



Monitoring Tornados

- Severe thunderstorms have the potential for increased tornado activity.
- Utilize multiple resources (NWS, NOAA, local media, cell phone applications, etc.) to monitor incoming weather in order to make the best decisions.
- Some communities have tornado alert systems. If your community has an alert system, be aware of its distance from your facility and the sound the alert makes when it is activated.

Your EAP for Tornados should include:

- Identify local early warning system/resources for monitoring incoming weather
- Identify appropriate safe shelter locations from your athletic facility
- Identify appropriate time for everyone to seek safe shelter
- Ensure your facility has appropriate resources available
- It is critical to establish and have effective means of communications with athletes, coaches, officials, spectators and league officials in the event of inclement weather

The best way to prevent the problems associated with heat and cold-related illness is to do the following:

- Properly educate coaches, athletes, and parents on heat illnesses, hydration strategies and heat acclimatization.
- Follow appropriate preseason heat acclimatization guidelines
- Take precautions when exercising in extreme environmental conditions.

Know *your local* and state guidelines for heat and cold injury prevention.

Heat-Related Illnesses Overview

The U.S. Consumer Product Safety Commission National Electronic Injury Surveillance System (NEISS) nationally estimated 54,983 heat-related injuries occurred in the United States from 1997 through 2006. Of these injuries, 47%

(26,171-national estimation) occurred in age's 19-years and younger, with 75.5% (41,538-national estimation) of all cases reported during sports and exercises.

Monitoring the Heat and Air Quality

Several sources should be used in monitoring weather changes including the National Weather Services (NWS), National Oceanic and Atmospheric Administration (NOAA), and local television, radio and newspapers. While using these sources of information is helpful in planning ahead, and monitoring changes in the weather pattern, it is important to monitor your onsite weather.

Wet Bulb Globe Temperature (WBGT) Heat Stress Monitoring & Region Specific Guidelines/Heat Index

- Current Recommendations are to utilize WBGT on-site at time of training and check as often as possible as it takes into account all environmental conditions.
- Heat index measurements do not account for radiant heat and wind.
- If a WBGT measure is not available, on-site measures of temperature and humidity can be used to predict WBGT using the chart below.

Different regions of the county experience different weather patterns. To account for variances throughout the country identify the region and modify practices and games based on the recommendation.

ACSM Modifying Practice Sessions for Exercise in Children (Exertional Heat Illness during Training and Competition, 2007.p566)

WBGT	Flag Colors	Level of Risk	Comments
< 50 C (<50 F)	White	High Risk (Hypothermia)	May occur in slower paced athletes, especially in wet and/or windy condition
<18 C (<65 F)	Green	Low	Risk is low, but still exists on the basis of risk factors
18-23 C (65-73 F)	Yellow	Moderate	Risk level increases as event progresses through the day
23-28 C (73-82 F)	Red	High	Everyone should be aware of the injury potential; individuals at risk should not compete
> 28 C (> 82 F)		Extreme Hazardous	Consider rescheduling or delaying the event until safer conditions prevail; if the event must take place, be sure to be on high alert

Grundstein, A., Williams, C., & Phan, M. (2015, January).Regional heat safety thresholds for athletics in the contiguous United States.Applied Geography, 56, 55-60. Retrieved September 21, 2016

Activity Modification Recommendations (WBGT)

ALERT LEVEL	WBGT BY REGION (°F)			EVENT CONDITIONS	RECOMMENDED WORK TO REST RATIOS (ACTIONS & BREAKS)
	CAT 1	CAT 2	CAT 3		
BLACK	>86.2°	>89.8°	>92.0°	Extreme Conditions	No outdoor training, delay training until cooler, or cancel training.
RED	84.2-86.1°	87.8-89.7°	90.1-91.8°	High Risk for Heat Related Illness	Maximum of 1 hour of training with four separate 4-minute breaks within the hour. No additional conditioning allowed.
ORANGE	81.1-84.1°	84.7-87.7°	87.1-90.0°	Moderate Risk for Heat Related Illness	Maximum of 2 hours of training with four separate 4-minute breaks each hour, OR a 10-minute break every 30 minutes of training.
YELLOW	76.3-81.0°	79.9-84.6°	82.2-87.0°	Less than Ideal Conditions	Three separate 4-minute breaks each hour, OR a 12-minute break every 40 minutes of training.
GREEN	<76.1°	<79.8°	<82.1°	Good Conditions	Normal activities. Three separate 3-minute breaks each hour of training, OR a 10-minute break every 40 minutes.

This guideline was developed by U.S. Soccer's Sports Medicine Department in collaboration with the Korey Stringer Institute

Georgia High School Association

GHSA: WGBT Activity and Rest Break Guidlines

Under 82.0
Normal Activities - Provide at least three separate rest breaks each hour with a minimum duration of 3 minutes each during the workout.

82.0 - 86.9
Use discretion for intense or prolonged exercise; watch at-risk players carefully. Provide at least three separate rest breaks each hour with a minimum duration of 4 minutes each.

87.0 - 89.9
Maximum practice time is 2 hours. For Football: players are restricted to helmet, shoulder pads, and shorts during practice, and all protective equipment must be removed during conditioning activities. If the WBGT rises to this level during practice, players may continue to work out wearing football pants without changing to shorts.
For All Sports: Provide at least four separate rest breaks each hour with a minimum duration of 4 minutes each.

90.0 - 92.0
Maximum practice time is 1 hour.
For Football : no protective equipment may be worn during practice, and there may be no conditioning activities.
For All Sports: There must be 20 minutes of rest breaks distributed throughout the hour of practice.

Over 92.0
No outdoor workouts. Delay practice until a cooler WBGT level is reached.

WBGT estimates from Ambient Temperature and Relative Humidity Measurements

Wet Bulb Globe Temperature (WBGT) from Temperature and Relative Humidity

Relative Humidity (%) \ Temperature in Degrees Celsius	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
0	14.8	16.1	18.0	18.6	19.8	21.1	22.3	23.5	24.7	25.8	27.0	28.1	29.3	30.3	31.4	32.5
5	15.3	16.7	18.7	19.4	20.7	22.0	23.3	24.6	25.9	27.2	28.4	29.6	30.9	32.2	33.4	34.6
10	16.0	17.4	19.4	20.2	21.6	23.0	24.3	25.7	27.1	28.4	29.7	31.1	32.4	33.8	35.1	36.4
15	16.5	18.0	20.1	20.9	22.4	23.8	25.2	26.7	28.1	29.6	31.0	32.4	33.8	35.2	36.7	38.1
20	17.1	18.7	20.8	21.6	23.1	24.6	26.2	27.7	29.2	30.6	32.1	33.6	35.1	36.6	38.2	39.7
25	17.6	19.3	21.4	22.3	24.0	25.5	27.0	28.6	30.1	31.7	33.2	34.8	36.3	37.9	39.5	
30	18.2	19.8	22.0	23.0	24.6	26.2	27.8	29.4	31.0	32.7	34.2	35.9	37.4	39.1		
35	18.7	20.3	22.6	23.6	25.3	26.9	28.6	30.2	31.9	33.5	35.2	36.8	38.5			
40	19.3	20.9	23.2	24.3	26.0	27.6	29.4	31.0	32.7	34.4	36.1	37.8	39.5			
45	19.7	21.5	23.8	24.9	26.6	28.3	30.1	31.8	33.5	35.2	37.0	38.7				
50	20.2	22.0	24.3	25.5	27.3	29.0	30.8	32.5	34.3	36.1	37.9	39.6				
55	20.7	22.4	24.8	26.0	27.8	29.6	31.4	33.3	35.0	36.8	38.6					
60	21.1	22.9	25.4	26.6	28.4	30.2	32.1	34.0	35.7	37.5	39.4					
65	21.6	23.2	25.9	27.1	29.0	30.9	32.7	34.5	36.4	38.2						
70	22.1	23.9	26.4	27.6	29.4	31.4	33.3	35.1	37.0	38.9						
75	22.5	24.4	26.9	28.2	30.1	32.0	33.8	35.8	37.7	39.5						
80	22.9	24.8	27.4	28.7	30.6	32.5	34.4	36.3	38.2							
85	23.3	25.2	27.8	29.2	31.1	33.0	35.0	36.9	38.9							
90	23.7	25.7	28.3	29.6	31.6	33.5	35.5	37.5	39.5							
95	24.2	26.1	28.7	30.1	32.0	34.0	36.0	38.0	40.0							
100	24.5	26.5	29.1	30.5	32.5	34.5	36.5	38.5								

NOTE: This chart is calculated using temperature and humidity, assuming a very clear sky (maximal solar load), and atmospheric pressure of 1ATA (760 mmHg). Chart A was developed by Professor Yoram Epstein to be used in Ariel's Checklist for hikers in Israel.

The quality of air our athletes breathe is very important during training and activity. Unfortunately, the quality of air we breathe can effect athletic performance, as well as put at risk individuals in danger of having health related issues. At risk people include people with lung disease such as asthma, chronic bronchitis, emphysema, children, older adults, active outdoor people, and healthy people who have a higher-sensitivity to poor air quality.

Air Quality Index (AQI)	Level of Concern	Color	Actions
0-50	Good	Green	None
51-100	Moderate	Yellow	Unusually sensitive people should consider reducing prolonged or heavy outdoor exertion
101-150	Unhealthy for Sensitive Groups	Orange	The following groups should reduce prolonged or heavy outdoor exertion: • People with lung disease, i.e. asthma • Children and older adults • People who are active outdoors
151-200	Unhealthy	Red	The following groups should avoid prolonged or heavy outdoor exertion: • People with lung disease, i.e. asthma • Children and older adults • People who are active outdoors • Everyone else should limit prolonged outdoor exertion
201-300	Very Unhealthy	Purple	The following groups should avoid all outdoor activity: • People with lung disease, i.e. asthma • Children and older adults • People who are active outdoors • Everyone else should limit outdoor exertion
301-500	Hazardous	Maroon	

Resources for monitoring the Air Quality Index (AQI):

- Air Now website (www.airnow.gove)
- Enviro Flash (www.enviroflash.info)
- National Weather Service (NWS)
- Local Media/News

HEAT Acclimatization

Heat Acclimatization

- Adjust gradually over several days in the environment in which the athlete will play.
- Increase intensity and duration of exercise in the heat over the first few days.
- If possible, schedule practices and games in the early morning or in the evening when temperature and humidity are lower.
- Depending on the region of the country, late afternoon is typically the hottest time.
- Heat acclimation will be more successful if athletes work out on their own for several weeks before practice officially begins.
  - Avoid 11am-3pm time due to the hottest part of the day.

TEMPERATURE AND HUMIDITY

- The body controls its temperature during exercise by sweating and the evaporation of sweat from the skin.
- As temperature and humidity increase, the body's ability to lose heat decreases.
- Temperature and humidity should be monitored before and during practices and games. Watch the local weather forecast for the temperature and heat index. Refer to the Relative Humidity Chart.
- Know your organization's policy regarding the monitoring of environmental conditions.

RECOMMENDED HEAT ACCLIMATION

- **Heat acclimation period** – The initial 14-consecutive days of preseason practice. This period is to enhance heat tolerance and increase the ability to exercise safely and effectively in warm to hot conditions.
  - Any practices or conditioning conducted before this time should not be considered a part of the heat-acclimation period.
  - Days on which athletes do not practice due to a scheduled rest day, injury, or illness do not count toward the heat-acclimation period.
- **Incoming athletes** – An athlete who arrives after preseason acclimation has started should be required to complete the 14-day acclimation before he or she can participate in regular season practice.
- **Rest** – Athletes should have one day of complete rest (no conditioning, walk-through, practice, weight training, etc.) after each six consecutive days of activity.
- **Practice** – Period of time a participant engages in a coach-supervised, and/or school-approved, sport, or conditioning related physical activity.
- **Walk-through** – A teaching opportunity in which athletes do not wear protective equipment (helmets, shoulder pads, catcher's gear, shin guards) or use other sport-related equipment (footballs, lacrosse, sticks, blocking sleds, pitching machines, soccer balls, marker cones).
- **Recovery period** – Time between the end of one practice and the beginning of the next.

Refer to the sample 14-day heat acclimation period

TIME-OUT!

Children's bodies warm-up and cool-down slower than adult bodies.

14–DAY HEAT ACCLIMATION PERIOD

- Days1-5:Athletes may not participate in more than one practice per day. Total time of practice should not exceed three hours in any one day.
  - A one-hour maximum walk-through is permitted during day 1-5 of the heat-acclimation period. A three-hour recovery period should be inserted between the practice and walk-through (or vice versa).
  - Days 1-2: In sports requiring helmets or shoulder pads, a helmet should be the only protective equipment permitted (Goalies, as in field hockey, and related sports, should not wear full protective gear or perform activities that would require protective equipment).
  - Days 3-5: Only helmets and shoulder pads should be worn.
- Day 6: All protective equipment may be worn and full contact may begin.
  - Football only: On days 3-5, contact with blocking sleds and tackling dummies may be initiated.
  - Full-contact sports: 100% live contact drills should begin no earlier than day six.
- Days 6-14: Double practice days must be followed by a single-practice day.
  - On single-practice days, one walk-through is permitted, separated from the practice by at least three hours of continuous rest.
  - When a double-practice day is followed by a rest day, another double-practice day is permitted after the rest day.
  - On a double practice day, neither practice should exceed three hours in duration, and athletes should not participate in more than five total hours of practice.
  - Practices should be separated by at least three continuous hours in a cool environment.

Disclaimer: Check state and local laws, school, league, and/or other organization policies for your area.

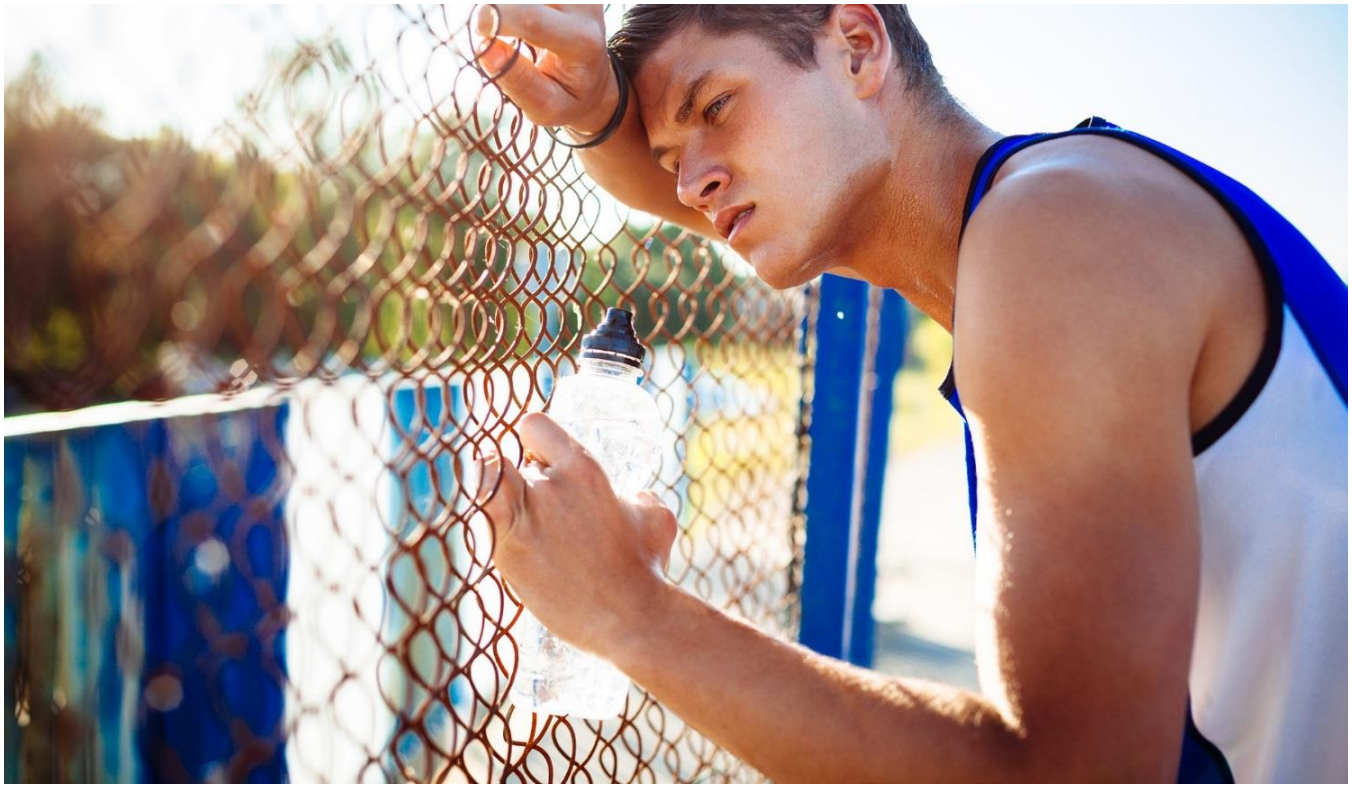
TIME-OUT!

Cool the body before transport.

HEAT ILLNESSES

CONDITION	CAUSE	OCCURRENCE AND PRECAUTIONS	SIGNS & SYMPTOMS	TREATMENT- CALL911
Exercise Associated Muscle Cramps	Excessive loss of bodily fluids from sweating, loss of sodium, and/or muscle fatigue	Usually presents during or after activity	Involuntary muscle contractions or cramping, usually in the calf but may occur elsewhere. In severe cases, cramping will occur in multiple places due to excessive loss of fluid and sodium.	1) Start replacement fluids 2) Stretch the involved muscle 3) Remove excessive clothing and equipment 4) Apply ice over cramping muscles in conjunction with stretching 5) Replace sodium with sports drink
Heat Syncope (Collapse)	Rapid fatigue when exercising in high temperatures	Commonly occurs the first 5 days during or with People with heart disease or taking diuretics. Commonly occurs after standing for long periods of time, immediately following activity, or after standing up rapidly from a resting of seated position.	· Weakness · Faintness, especially after exercising or standing in the heat. · Tunnel vision · Pale or sweaty skin · Decreased pulse rate · Dizziness · Lightheaded	**1) Activate the Emergency Action Plan** **2) CALLEMS** 3) remove excessive clothing and equipment 4) Place athlete in a cool and shaded area 5) Elevate the legs above the head 6) Monitor vital signs 7) Replenish athlete's fluids if the athlete is conscious and coherent 8) Place in cooling tub
Heat Exhaustion	Inadequate replacement of fluids	Occurs most frequently during hot and humid conditions. Maybe difficult to distinguish without measuring core body temperature.	· Headache · Weakness · Confusion/disorientation · Profuse sweating · Nausea and/or vomiting · Diarrhea · Pale skin · Cool, clammy skin · Dizzy/light headed · Rapid weak pulse · Core body temperature of 97˚F - 104˚F · Light headedness · Syncope · Decrease urine output · Muscle cramps · Abdominal/intestinal cramping · Hyperventilation · Altered consciousness	**1) Activate the Emergency Action Plan** **2) CALLEMS** 3) Remove excessive clothing and equipment 4) Move athlete to a cool and shaded area and reduce body temperature by fanning and placing ice or ice bags in contact with athlete's body. Ice bags can be placed in the armpit and groin region 5) Replace the fluid in the athlete if he/ she is able to drink 6) Place in cooling tub

CONDITION	CAUSE	OCCURRENCE AND PRECAUTIONS	SIGNS &SYMPTOMS	TREATMENT-CALL911
HEATSTROKE **THIS IS A LIFE THREATENING CONDITION**	Severe rise in temperature Caused by failure of the body's coding mechanisms	The risk of morbidity and Mortality is greater the Longer an athlete's body Temperature remains above 106˚F and is significantly reduced if core body temperature is lowered rapidly	· Altered mental function with possible collapse and loss of consciousness · Hot red skin · Rapid strong pulse · Shallow breathing · Core body temperature approximately 105˚F · Tachycardia (100-120 bpm) · Drowsiness · Irrational behavior · Hysteria · Apathy · Aggressiveness · Delirium · Disorientation · Staggering	**1) Activate the Emergency Action Plan** **2) CALLEMS** 3) Lower body temperature as quickly as possible with the use of a cold tub with the water being circulated. 4) If cold tub is not available use other methods to cool athlete quickly including: Place under cool water (i.e. place in shower or run water from a hose over athlete), iced cloths, sponges, and ices bags to the groin, neck and armpits, ice tubs, etc. 5) Move the athlete to a cool and shaded area 6) Remove excessive clothing and equipment 7) Ensure proper breathing 8) Monitor vital signs 9) Transport athlete once body temperature has returned to 102˚ F
EXERTIONAL HYPONATRMIA	Caused by an imbalance of fluid and electrolyte		· Core body temperature <104˚F · Nausea · Vomiting · Extremely (hands and feet)swelling · Low blood sodium level · Progressive headache · Confusion · Significant mental compromise · Lethargy · Altered consciousness · Apathy · Pulmonary edema · Seizures · Coma	**1) Activate the Emergency Action Plan** **2) CALLEMS** 3) Do not give any fluids 4) Immediate transfer to an emergency medical center



TIME-OUT!

Never leave an athlete alone if he/she is showing signs of heat illness.

- While numerous means of evaluating the body's temperature is available (ear, under the tongue, under the armpit, etc.), a rectal temperature assessment is currently the only means of accurately assessing the body's actual core body temperature, and thus requires further training and education, which is outside the scope of this course.
- If there is no way to accurately measure the internal temperature, do not transport until the athlete is shivering.
- It is recommended that you review all state and local guidelines for assessing core body temperature, and follow your athletic administration's policy and procedures for assessing, managing, and treating heat-related illnesses.

Risk Factors for Heat-Related Illnesses

- **Heat Illness Environmental Risk Factors**
  - Ambient air temperature
  - Relative humidity
  - Air motion
  - Amount of radiant heat from the sun or other sources
- **Heat Illness Non-Environmental Risk Factors**
  - Level of Hydration
  - Current Illnesses
  - History of Heat Illness
  - Increase Body Mass Index
  - High Wet-Bulb Globe Temperature on previous day and at night
  - Mental health Illnesses/Concerns
  - Poor Physical Condition
  - Excessive and/or dark colored clothing and/or equipment
  - Females
  - People under the age of 15
  - People over the age of 50

- Areas of higher population density (i.e. bigger cities, etc.)
- Alcohol use
- Overzealous individuals

- **Dress**
  - Early season practices should be in shorts and t-shirts to allow for gradual acclimation.
  - In hot environments, uniforms should allow for maximum exposure of skin to ensure the evaporation of sweat.
  - A great deal of heat is lost through the head, thus, helmets should be removed frequently during practice or games.
  - Appropriate dress should be followed for indoor events as well. Individuals can still develop a heat illness from activity, dehydration and other elements.
  - Performance apparel is better than cotton.
  - Rubber or plastic suits may produce life threatening consequences because they do not allow for cooling by evaporation of sweat.
  - Darker colored athletic equipment absorbs and retains radiant heat. Lighter color and breathable materials are preferred.
  - Equipment (i.e. helmets, padding, etc.) and intensive sports (i.e. football, field hockey, lacrosse, etc.) can increase core body temperature during activity.
  - Lack of Acclimatization to the Heat and/or Humidity
  - Medication, Drugs and Supplements
  - Skin conditions (i.e. sunburn, sensitivity to sun exposure, etc.)
  - Increase intensity of exercises
  - Increase duration of exercises
  - Electrolyte Imbalances
  - Medical Conditions with relations to Heat Illness
  - Sickle Cell Trait (See Module 4)
  - Asthma (See Module 4)

Population Concerns: An Increase Risk for Concern

- **Children**
  - **Response for Heat: Reasons for Concern**
  - A decreased ability to sweat during hot and humid conditions
  - Higher skin temperatures
  - A lower heart rate during work
  - An increase of blood flow to the extremities
  - A decrease ability to acclimatize to heat (slower and takes longer)
  - Small body size
  - Different stages of growth development
  - Predisposing conditions (obesity, childhood illnesses)
  - **Reducing the Risk**
  - Including the precautions taken for adults, encourage children to ingest fluid every 15 to 30 minutes during activity, even if they are not thirsty
  - Monitoring weather conditions and modifying practice times, intensity and rest breaks accordingly.
  - Modifications can include:
    - Longer and more breaks
    - Moving Practices indoors
    - Removing equipment

- **Older Aged Athletes (>50 years old)**
  - **Response for Heat: Reasons for Concern**
  - Physiological and functional ability can vary
  - Older people are more predisposed to dehydration
  - **Reducing the Risk**
  - Older athletes should be evaluated and cleared by their treating physician prior to activity
- **Decreasing Heat-Related Illnesses**
  - Acclimatization
  - Adequate hydration
  - Adequate sleep
  - Adequate nutrition
  - Decrease WBGT
  - Improved physical fitness

- Frequent risk breaks during exercise
- Monitoring weather changes
- Monitoring the health-changes of participating athletes

Exertional Rhabdomyolysis

Exertional Rhabdomyolysis (ER) is the breakdown of muscle and the release of the components of muscular tissue. While environmental factors (heat, humidity, ambient air, altitude, etc.) can play a part in the breakdown of tissue, ER commonly occurs as a response to excessive, prolonged and repetitive exercises. (The NCAA Sports Medicine Handbook Guideline 2T Exertional Rhabdomyolysis, p99 is an additional resource)
http://www.ncaapublications.com/productdownloads/MD14.pdf

Risk Factors

- Low fitness levels with early introduction to repetitive exercises
- Eccentric exercises
- High Body mass index
- Ongoing viral illness
- High altitudes
- Sickle Cell
- Supplements (ephedra, caffeine)
- Certain medications and drugs
- Alcohol
- General medical conditions effecting muscle tissue
- Excessive environmental heat-related stress

Sign & Symptoms

- Severe muscle pain during activity
- Severe muscle pain during passive motion
- Swelling around muscles
- Muscular weakness within the first 24-72 hours following extreme, prolonged non-familiar exercises
- Pain is typically out of proportion
- Dark brown/red, cola colored urine

Treatment

- Activate your Emergency Action Plan
- This is a medical emergency

Prevention

- Have an emergency action plan for managing this condition
- Avoid high intensity and repetitive exercises following the return from vacation/breaks or at the start of a training session
- Buildup and start slowly with conditioning and training
- Encourage athletes to pace themselves during high intensity and high repetition exercises and conditioning
- Post urine charts in bathrooms/locker rooms
- If one athlete experiences these symptoms, all athletes should be evaluated by a licensed Health Care provider
- Athletes with ER should be evaluated by a physician prior to their return to activity

Return to Play following Heat-Related Illnesses

Anyone sustaining a heat-related illness should be evaluated by a licensed medical provider prior to their return to practice or play. Following medical clearance and return to play, the athlete should be closely monitored, as they are more susceptible to recurrent heat-illnesses.

HYDRATION

Introduction

It is important for everyone to begin activity in a state of proper hydration. Maintaining normal and proper hydration (euhydration) of those involved in athletics is critical in the athlete's performance as dehydration (loss of body water) can lead to a decrease in athletic performance and ability. The loss of body water can also make one more susceptible for developing heat and cold-related illnesses. Having a proper plan for monitoring and maintaining proper levels of hydration in those involved in athletics is critical in minimizing these potential catastrophic negative effects of dehydration.

DEHYDRATION - IT CAN HAPPEN FASTER THAN YOU THINK!

- In less than one hour of physical activity, an athlete may become dehydrated. Health and performance will suffer.
- Dehydration of just 1-2% of body weight (only 0.6-1.2 lbs. for a 60 lb. athlete, 1.2-2.4 lbs. for a 120 lb athlete, and 2.0-4.0 lbs for a 200lb. athlete) can negatively influence performance.
- Dehydration of greater than 3% of body weight substantially increases an athlete's risk of heat illness.
- During physical activity, most athletes drink only enough fluid to replace 50% of what was lost.
- Thirst should not be used as a guideline.
    - Once an athlete is thirsty, he or she has already started to become dehydrated.
- Before participating, have a rehydration plan for all athletes.

Level of Hydration	Heat Related Illness Concerns
Hyperhydration	Hyponatremia (electrolyte imbalance)*
Euhydration	Normal Hydration
Hypohydration	Heat Cramps, Heat Exhaustion, Heat Stroke

TIME-OUT!

Do not give salt to your athletes.
They should receive the recommended amount of salt in their daily diets.

DEHYDRATION FACTS

- Impairs mental function
- Decreases motivation to exercise
- Decreases time to exhaustion
    - Loss of 2% of body weight: 10%-20% decrease in mental function, motivation, endurance, strength
    - Loss of over 4% of body weight: 35%-48% decrease in mental function, motivation, endurance, strength
- Decreases strength
- Reduced heat tolerance
- Heart rate increases an additional 3-5 beats per minute for every 1% of body weight lost due to dehydration

SEE WEIGHT LOSS CONVERSION CHART on the following page

DEHYDRATION WARNING SIGNS

- Thirst
- Irritability
- Headache
- Weakness
- Dark colored urine
- Muscle cramps
- Decreased performance
- Dizzy or light headed
- Lack of concentration
- Nausea and/or vomiting

Monitoring Your Level of Hydration

- Measuring your level of hydration can be easily accomplished through monitoring the color of your urine, frequency of urination and measuring your weight.
- Other more scientific means of monitoring your level of hydration are available (i.e. refractometer, and urine osmolality).
- Posting a urine color chart in bathrooms is a helpful way for everyone to monitor their hydration status during activity and competition.

Urine Hydration Status Chart

1	Well Hydrated	
2	Well Hydrated	If your urine matches colors 1, 2, or 3, you are properly hydrated.
3	Minimal Dehydration	Continue to consume fluids at the recommended amounts.
4	Minimal Dehydration	If your urine is below the red line, you are dehydrated and at risk for developing heat-related illnesses, including cramps, exhaustion, and stroke.
5	Significant Dehydration	
6	Significant Dehydration	**Continue to consume more water**
7	Serious Dehydration	
8	Serious Dehydration	

WEIGHT

- An athlete should weigh-in before and after practice and games. This can help with monitoring hydration status:
  - Well Hydrated: +1% to -1% Body weight change
  - Minimal Dehydration: -1% to -3% Body weight change
  - Significant Dehydration: -3% to -5% Body weight change
  - Serious Dehydration: -5% and Greater body weight change
- Athletes should weigh-in with similar clothes before and following activity (i.e. if the clothes were dry during weigh- ins, the athlete should weigh-out [following activity] in similar dry clothes).
- An excessive loss of fluid is indicated by a net loss of 2% or more of body weight after exercises
- Athletes should weigh in on the subsequent practice or competition at the pre-activity weight. Weight loss more than 2% indicates an increase in risk for developing heat-related illnesses.
- An athlete is dehydrated and susceptible to heat-related illness if he does not replace at least half of the 2% of weight lost.
- Light weight athletes have less muscle mass in which to lose fluids and, therefore, are at risk for heat problems.

Weight Loss Conversion Chart

Weight Pre-Practice	-2%	Weight Post-Practice	-4%	Weight Post-Practice
80	1.6	78.4	3.2	76.8
100	2	98	4	96
120	2.4	117.6	4.8	115.2
140	2.8	137.2	5.6	134.4
160	3.2	156.8	6.4	153.6
180	3.6	176.4	7.2	172.8
200	4	196	8	192
220	4.4	215.6	8.8	211.2
240	4.8	235.2	9.6	230.4
260	5.2	254.8	10	249.6
280	5.6	274.4	11	268.8
300	6	294	12	288
320	6.4	313.6	13	307.2
340	6.8	333.2	14	326.4

What to Drink and What Not to Drink

- People are more likely to consume fluid when it is readily available
- What to drink:
  - Fluid palatability is influenced by several factors (temperature, sodium content and flavoring)
  - Temperature 15 and 21* C (59˚F-70˚F)
  - Fluid that is easily and readily available
  - Fluid that taste good
- What not to drink:
  - Fruit Juice, Carbohydrate Gels, Sodas, Sports drinks with a carbohydrate concentration greater than 8%, caffeine, alcohol, energy drinks

Fluid Replacement guidelines

- Before Activity:
  - Individuals should slowly drink beverages (5-7 mL·kg) per body weight at least 4 hours before exercise/training (i.e. 60-lb athlete would need to consume 22.36 fl oz-31.31 floz)
  - 500-600 mL (17-20 floz) 2-3 hours before activity
  - 200-300 mL (7-10 floz) 10-20 minutes before activity
  - If the individual does not produce urine, or the urine is dark or highly concentrated, she/he should slowly drink more (3-5 mL·kg ,about 2 hours before the event)
  - Consuming beverages with sodium (20-50 m Eq. L) and/or a small amount of salted snacks or sodium-containing foods at meals will help stimulate thirst and retain consumed fluids
- During Activity:
  - The rate of fluid consumption is based largely on the hydration status prior to the start of activity and based upon the amount of fluid lost during activity
  - The goal is to prevent excessive dehydration (>2% body weight loss from water deficit)
  - During intense exercises, the rate of sweating can be 1 to 2.5L/H (2-5 lbs) of body weight per hour
    - 200 to 300 mL (7-10 floz) every 10-20 minutes should be consumed during activity
  - Unfortunately, the volume of fluid that most athletes drink voluntarily during exercises replaces only about 50% of body-fluid loss during activity
  - Care is particularly important in activity lasting 3-hours and longer
  - Carbohydrate-based sports beverages are sometimes used to meet carbohydrate needs, while attempting to replace sweat, water, and electrolyte loss (6-8%)
  - After Activity:
  - The goal is to replace any fluid and electrolyte deficit
  - Pre-activity weight should be attained within 2 hours of the conclusion of activity
  - Replacing the deficit
  - **1 pound = 16 ounces**
  - **1 KG = 1 Liter**
  - Consume normal fluid and nutrients following activity
  - If there is significant deficit following activity (hydration & nutrition) consider more snacks and regular hydration following your post activity meal

COLD-RELATED ILLNESS

Introduction

While much attention is brought to heat-illnesses due to their potential catastrophic result and numerous media and news attention, many in athletics do not consider cold-weather related illnesses as a serious problem. With cold, windy and rainy months commonly occurring in the late-fall and early-spring throughout the United States, fall sports (end/post season) and spring sports (pre-/early season) may be more susceptible for developing cold-related illnesses. Similar to heat-related illnesses, proper education, awareness of signs and symptoms, proper treatment and management and understanding risk factors can help reduce cold-related illnesses in athletics.

Monitoring the Cold

Several sources should be used in monitoring weather changes including the National Weather Services (NWS), National Oceanic and Atmospheric Administration (NOAA), and local television, radio and newspapers. While using these sources of information is helpful in planning ahead, and monitoring changes in the weather pattern it is important to monitor your onsite weather. Monitor your local wind-chill factor (wind and temperature).

Wind Chill Chart

MPH	KNOTS	(Temperatures are in degrees Fahrenheit)																	
CALM	CALM	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	4	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
10	9	30	20	15	10	5	0	-10	-15	-20	-25	-35	-40	-45	-50	-60	-65	-70	-75
15	13	25	15	10	10	-5	-10	-20	-25	-30	-40	-45	-50	-60	-65	-70	-80	-85	-90
20	17	20	10	5	0>	-10	-15	-25	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-100
25	22	15	10	0	-10	-15	-20	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-105	-110
30	26	10	5	0	-5	-20	-25	-30	-40	-50	-55	-65	-70	-80	-85	-95	-100	-110	-115
35	30	10	5	-5	-5	-20	-30	-35	-40	-50	-60	-65	-75	-80	-90	-100	-105	-115	-120
40	35	10	0	-5	-10	-20	-30	-35	-45	-55	-60	-70	-75	-85	-95	-100	-110	-115	-125
Winds above 40 MPH have little additional effect		Little Danger of Frostbite				**INCREASINGDANGER** (Flesh may freeze within one minute)							**GREATDANGER** (Flesh may freeze within 30 seconds)						

COLD EVENT MANAGEMENT

- Evaluate immediate and projected weather information (air temp, wind, chance of precipitation, or water immersion, and altitude).
- Identify activity intensity and clothing requirements.
- The following guidelines can be used in planning activity depending on wind-chill temperatures.
    - 30˚ F and below: Be aware of potential for cold injury and notify appropriate personnel.
    - 25˚ F and below: Cover as much exposed skin as practical, and provide opportunities and facilities for re-warming.
    - 15˚ F and below: Consider modifying activity to limit exposure, or to allow more frequent chances to re-warm.
    - 0˚ F and below: Consider terminating or rescheduling activity.
- Identify possible activity modifications as conditions change (i.e. change activity times, allow more frequent chances to re-warm, allow changes to clothing or equipment, cancellation of event).
- Provide water or sports drinks as well as warm fluids.
- Provide warming facilities.
- Provide additional clothing and equipment for varying conditions.
- Implement exposure control and re-warming schedules as needed.
- Monitor environmental conditions and athletes regularly.
- Ensure medical staff is prepared to identify the signs and symptoms of a cold injury. Core temperature can be determined with a rectal thermometer only. It should be capable of measuring temperatures below 95˚ F.
- Prepare an Emergency Action Plan in the event that rapid transport is necessary.
- Identify warm, dry areas for athletes to passively re-warm, recover, or receive treatment.
- Provide heat packs, blankets, additional clothing, and external heaters, if feasible, for active re-warming.
- Telephone (check signal) or 2-way radio for emergency use.
- Notify area hospital and emergency personnel before large events to inform them of the potential for cold related injuries.

Cold Acclimatization

While the body does make some (minimal) adaptations to colder weather (temperature, wet, dampness, wind, etc), these changes do not mimic those changes the body makes in relation to the heat (temperature, humidity, etc.) and heat acclimatization.

Cold weather acclimatization can take up to 2-weeks, if not months, for little physical adaptation to occur. As the body does not acclimatize the actual freezing of soft tissue (skin, muscle, etc.), understanding cold weather related illness (hypothermia, frostbite, etc.) and other risk minimizing techniques (layering, environmental and non-environmental risk factors, etc.) must be incorporated into a strategic plan for minimizing cold-related illnesses.

HYPOTHERMIA

A decrease in core body temperature due to prolonged exposure to the following:

- Cold conditions
- Wet conditions
- A combination of cold and wet conditions

HYPOTHERMIA

TYPE	CORETEMP	SIGNS ANDSYMPTOMS	TREATMENT
Mild	95˚F(35˚C)- 98.6˚F(37˚C) 95˚F	· Amnesia · Lethargy · Vigorous shivering · Impaired fine motor control · Passage of large volumes of urine · Pale skin	1) Remove and damp/wet clothing 2) Cover(including head)with dry clothing/blanket 3) Encourage warm fluids and food 4) Avoid friction massage
Moderate	90˚F(32˚C)- 94˚F(34˚C)-	· Depressed respiration and pulse · Shivering stops · Bluish skin · Impaired mental function · Impaired gross motor control · Irregular heartbeat	1) This is a medical emergency (call911) 2) Check vital signs and CABs 3) Start CPR if necessary 4) Treat as mild hypothermia
Severe	Below 90˚F (32˚C)	· Rigidity · Slow heart rate · Respiration · Impaired mental function and gross motor skills · Slurred speech if conscious · Usually unconscious	1) This is a medical emergency (call911) 2) Check vital signs and CABs 3) Start CPR if necessary 4) Treat as mild or moderate hypothermia 5) Move gently to avoid causing CARDIACARREST!

FROSTBITE

An actual freezing of body tissue. A localized response to a cold, dry environment, yet moisture from sweating may exacerbate frostbite due to increased tissue cooling.

TYPE	SIGNS ANDSYMPTOMS	TREATMENT
Frost nip	· Superficial skin frozen · Redskin · Tingling or burning sensation · Tissue not permanently damaged	1) Remove from the cold 2) Cover the affected area 3) Do not rub the affected area 4) May place finger tips under armpit store-warm 5) May warm against another person's skin
Frostbite-Mild	· Dry, waxy, redskin · Swelling of tissue · Tingling or burning sensation · Skin contains white or blue-grey colored patches · Affected are a feels cold and firm to the touch	1) This is a medical emergency! 2) Remove from the cold 3) Cover the affected area 4) Do not rub the affected area 5) Rule out hypothermia
Frostbite-Severe	· Skin is cold, hard and does not rebound · Skin is purple · Numbness, burning, aching, throbbing, or shooting pain · Blisteringmaydevelopwithin36-72hours · Muscle, peripheral nerve, tendon, and bone damage likely	1) This is a medical emergency! Seek medical attention immediately 2) Remove from the cold 3) Cover affected areas 4) Do not rub affected areas 5) Rule out hypothermia

CHILBLAIN

- Is an exaggerated response of the body to cold and wet conditions causing an inflammatory response at the site of exposure.
- Is considered a non-freezing cold injury.
- The hands and feet are most likely to be effected.
- Commonly occurs within 1-5 hours of cold and wet exposure.
- Be aware of wet and cold exposures longer than 1 hour, when temperatures are 50˚ F or less.

Signs and Symptoms

- Red or blue colored skin lesions
- Swelling
- Increased temperature
- Itching
- Numbness
- Burning and/or tingling of the skin
- Skin necrosis
- Skin sloughing

Treatment

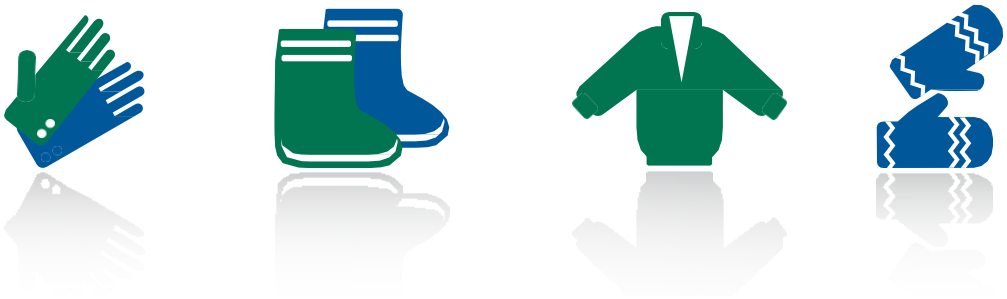
- Remove from wet and cold environment
- Remove damp, wet and constrictive clothing and change into loose, dry clothing
- Wash and dry the area gently
- Gently elevate the area
- Use blankets if necessary to gently re-warm:
    - Be aware that during the re-warming process, the person may experience skin inflammation, itching and an increase in pain
    - Do not pop any blisters
    - Do not apply any friction cream or lotion to the affected area
    - Do not use high levels of heat
    - Do not weight-bear on affected areas
- Monitor vitals during treatment and re-warming

LAYER CLOTHING

1st Layer Wicks away sweat from the body
2nd Layer Provides insulation
3rd Layer Removable, breathable, wind and water resistant clothing allows for evaporation of moisture

As cold-weather illnesses are prevalent to the hands/toes, feet/toes, nose and ears wearing, the following can help prevent inadvertent skin exposure to the cold:

- Gloves and mittens should fit comfortably
- Hats should fully cover the head, and extend over the ears
- Head bands and ear muffs should cover the entire ear
- Face masks can be used to cover the face and nose



PREVENTION OF COLDILLNESS

- Educate athletes about cold illness.
- Wear appropriate clothing that is windproof and waterproof, yet allows for evaporation of sweat.
- Dress in thin layers of clothing that may be easily removed and added as the temperature changes.
- Engage in warm-up activities to raise body temperature.
- Monitor weather conditions, including wind chill factors.
- Modify activities in high risk conditions.
- Replace fluids often, as cold weather dulls the thirst mechanism.
- Eat a well-balanced diet.
- Remove wet clothing as soon as possible.
- For extended outdoor activity, allow athlete to acclimate.
- Protect fingers, ears, and skin if conditions suggest that frostbite is possible in exposure of 30 minutes or less.
- Avoid alcoholic beverages and nicotine.

COLD ILLNESS FACTS

- "After drop" – A serious condition in which the core temperature can decrease as the body warms.
- Shivering helps to warm the body.
- As conditions worsen, the body will stop shivering, and other bodily functions will slow down (breathing, talking, muscle contractions, etc.)

RISK FACTORS FOR COLD-RELATED ILLNESSES

Cold Illness Environmental Risk Factors

- Lower Air Temperature
- Wind
- Humidity
- Rain
- Immersion
- Little Thermal Radiation (Lower Temperature)
- Lower Wind Chill Factor (Temperature over Wind Speed)

Cold Illness Non-Environmental Risk Factors

- Previous Cold-Weather Illnesses
- Lower caloric Intake
- Dehydration
- Fatigue
- African - American
- Nicotine
- Alcohol
- Drug and Medication(causing depressive functioning of the body)
- Aerobic Fitness level and Training (lower fitness level)
- Females
- Clothing (poor layering, poor clothing material, etc.)
- Predisposing Medical Conditions:
    - Exercise-Induced Broncho spasm (i.e. exercise-induced asthma)
    - Higher occurrence in:
        - Athletes
        - Women

- Athletes who participate in indoor ice facilities
- Raynaud Syndrome
  - Blood vessel spasms in the hands/fingers and feet/toes caused by cold exposure
- Anorexia Nervosa
- Cold Urticaria (allergy to cold temperatures)
  - Can occur within minutes of, or following exposure to the cold
  - Wheals (hives)
  - Redness
  - Itching
  - Edema (Swelling)
- Cardiovascular disease

Factors that put athletes at risk for cold illness

- Prolonged exposed to:
  - Prevention of Cold Illness
  - Risk Factors for Cold Injuries
  - Hypothermia
  - Cold Illness facts
  - Frostbite
  - Re-Warming
  - Cold Event Management

RISK FACTORS FOR COLD INJURIES

- Lean body composition
- Females
- Older age
- African Americans
- Lower fitness level
- Presence of pre-existing conditions (i.e. cardiac disease, anorexia, Raynaud syndrome, exercise-induced broncho spasm)

RE-WARMING

Mild to Moderate Cold Illness:

- When re-warming, monitor athlete for “after drop”, a condition in which the core temperature decreases.
- Re-warm at room temperature to prevent further tissue damage.
- May place affected tissue against another person’s warm body.
- Apply heat to the trunk, axilla, chest wall, and groin only.
- If using water, the water should be warm to the touch, but not hot.
- Do not use dry heat or steam to re-warm.
- Leave any fluid-filled blisters intact.
- When re-warming always be aware of possible cardiac arrest!
- Do not rub the area.

TIME -OUT!

A key component in the management of moderate and severe cold injuries is re-warming. However, there is a specific way to re-warm a body part in order to have the least amount of damage and this should be done in a controlled setting where re-warming temperature can be monitored by a professional.

SUMMARY

- An appropriate emergency action plan should be created for your facility/venue, reviewed and rehearsed for environmental concerns (lightning, tornado, heat and cold).

    - Key Points
    - Who is monitoring weather changes?
    - What resources are available for monitoring weather changes?
    - What is safe, and what is not considered a safe shelter?
    - How are changes in the weather being both appropriately and effectively communicated?

- Identify local early warning system/resources for monitoring for weather changes.
- Information relayed from The National Weather Service (NWS) and National Oceanic and Atmospheric Administration (NOAA) can help identify weather patterns and changes.
- Even though officials usually make the final ruling for severe weather, it is imperative that facility and league officials communicate effectively prior to the start of practice/competition the EAP for weather.
- Be aware that weather can change with little to no advanced notice.
- A safe shelter location should be designated in the emergency action plan, and be effectively communicated with the athlete, coaches, officials, league administrators and spectators as weather patterns change.

Lightning

- A majority of lightning victims were heading to a safe shelter when they were struck
- 90% of lightning causalities occur from May to September
- Are most common during the summer afternoon and evening
- There is no safe place outdoors during a thunderstorm/lightning storm
- Lightning can strike upwards of 7-10-miles away
- It does not need to be presently be raining for lightning to be present
- Proper care of a lightning-struck victim should not be delayed unless the scene is unsafe

Tornado

- Tornado activity is more common in tornado alley (the region in central Texas, westwards towards eastern Colorado, northward towards northern Nebraska and Iowa, eastwards as of Ohio, and extending southward to Florida
- Be aware and utilize your local tornado alert notification system

Hydration

- Dehydration of only 1% can negatively influence your athletes performance
- Dehydration of only 3% can make you more susceptible for developing a heat-related illness
- Provide ample fluid for athletes during all activity (conditioning, training, practice, games)
- Athletes commonly replace only 50% of the fluid lost during activity
- Be aware of the signs and symptoms of dehydration, and make sure you educate your athletes on the importance of proper hydration

Heat Illness

- Use the heat index and air quality index to make appropriate decisions regarding outdoor activity and sports
- A Wet-Bulb Globe Temperature (WBGT) onsite is an easy and convenient method for measuring heat stress
- As the weather changes (heat, humidity, wind speed, etc.) make modifications to avoid the potential for athletes developing heat-related illnesses
- Adjusting gradually to the heat over 10-15 days is helpful in allowing athletes to properly acclimatize
- Schedule practice and games when heat and humidity are not as high, usually in the early mornings or evenings
- Understand both environmental and non-environmental heat-illness risk factors
- Become familiar with the signs and symptoms of heat-related illnesses and appropriate treatment, should start to occur.

Cold Illness

- Less the importance of appropriate layering to your athletes
- As the weather changes (cold, wet, damp, wind, etc..) make modification to avoid the potential for athletes developing cold-related illnesses
- Have an appropriate re-warming plan to avoid the development of cold-related illnesses
- Understand both environmental and non-environmental cold-illness risk factors
- Become familiar with the signs and symptoms of cold-related illnesses and appropriate treatment, should it occur

MODULE 3

EMERGENCY RECOGNITION

INTRODUCTION

PURPOSE

- Assess the vital systems of the body
- Recognize emergency conditions
- Recognize emergency signs and symptoms
- Differentiate between emergency and non-emergency situations

CPR GUIDELINES

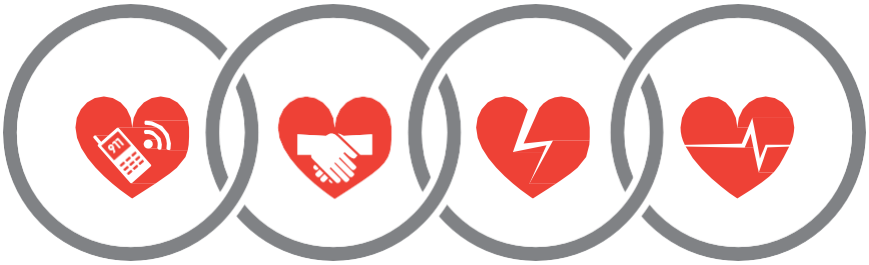
- This module is not intended to serve as a CPR course. Only people trained should perform chest compressions. After completing CAB's, follow CPR guidelines as taught by Red Cross and American Heart Association. Child and adult CPR have different guidelines.
    - We highly recommend everyone become and appropriately maintain certification in Cardiopulmonary Resuscitation (CPR) and how to use an automated external defibrillator (AED). This course is not intended to serve as a CPR or AED certificate course.

  For training and certification in this area, please contact your local branch of the American Red Cross (http://www.redcross.org/lp/take-a-class) or the American Heart Association (http://www.heart.org/HEARTORG/CPRAndECC/CPR_UCM_001118_SubHomePage.jsp)

CHAIN OF SURVIVAL

- **Can improve chances of survival and recovery for victims of heart attacks, strokes, and other emergencies.**

1. Recognition and Activation of the emergency response system
2. Early performance of high quality CPR with emphasis on chest compressions
3. Rapid Defibrillation
4. Effective Advanced Life Support
5. Integrated Post Cardiac Arrest Care



TIME-OUT!

In most areas, the 911 dispatcher can talk a person untrained in CPR through the process.

VITAL SIGNS

The body has nine vital signs that indicate changes in body function. These signs may be quickly assessed. To recognize an abnormal reading you must first know what is normal.

- Pulse
- Respiration
- Blood pressure
- Temperature
- Skin color
- Pupils
- State of consciousness
- Movement
- Pain

Vital signs of a conscious injured athlete should be checked regularly and written down for reference.

PULSE

A pulse is the pressure wave created in an artery. Changes in pulse represent a change in heart rate. The chart below shows normal resting pulse rates for the age ranges indicated.

AGE	RANGE	AVERAGE
3 mo. - 2 years old	100-190	130
2-10 years old	60-140	80
Greater than 10 years old	60-100	75

WHEN TO CHECK FOR A PULSE

When to Check for a Pulse:

- Unconscious Athlete
- Suspected fracture or dislocation
- If the athlete reports numbness or tingling in an arm or leg
- If the skin color appears blue, red, or white
- If you suspect they are in shock
- If they report being bite or stung by an insect
- If they report having come in contact with some allergen (medication, food, latex, etc.)

When taking a pulse, it should be taken for one-minute. The evaluator should note not only the beats per minute [bpm], but also note its rhythm (even, uneven) and strength (strong, weak).

WHERE TO TAKE A PULSE

The two most common areas to take a pulse are:

- Carotid artery in the neck
- Radial artery on the thumb side of the wrist

In the lower extremity:

- There is a pulse on top of the foot called the dorsalispedis.
- The femoral pulse is important to test especially in the setting of shock where more peripheral pulses may be diminished.

RESPIRATION

Normal respiration is:

- Unlabored with about 12 breaths per minute in adults
- 12-24 breaths for children
- For well-trained athletes, respiration is usually lower than average at rest

ABNORMAL	MAY INDICATE	ACTION
Shallow respiration	Shock	1) Activate EAP 2) Elevate feet 3) Monitor vital signs
Shortness of breath, coughing, wheezing, difficulty breathing	Anaphylax	1) Activate EAP 2) If needed, administer appropriate medication by trained professional 3) Monitor vital signs
Irregular or gasping respiration	Airway obstruction Asthma	1) Activate EAP 2) Clear airway 3) Calm athlete
Absence of respiration	Respiratory arrest	1) Activate EAP 2) Begin CPR if trained

TIME-OUT!

If not recognized and managed, shock can cause serious tissue damage and even death.

HYPERVENTILATION

Hyperventilation occurs when the athlete is breathing too rapidly.

Signs and Symptoms of Hyperventilation The athlete complains of:

- Numbness
- Tingling in hands
- Dizziness or light headedness
- Shallow and rapid respiration

Management of Hyperventilation

- Calm and reassure the athlete.
- Instruct them to slow down his/her breathing.
- Have the athlete breathe in through the nose and out the mouth. This will help establish a slower rhythm.
- Have the athlete cover his or her mouth and nose then breathe with a paper bag. If rapid breathing continues, have the athlete breathe into the bag.
- Activate Emergency Action Plan if breathing cannot be slowed.

BLOOD PRESSURE

- Blood pressure is the amount of pressure exerted against the artery walls caused by contractions (Systolic) and relaxation (Diastolic) of the heart.
- Measuring blood pressure requires a high degree of experience and repetitive measurements in order to improve accuracy.
- Required tools
  - Appropriate sized blood pressure cuff
  - While not always as accurate as manual blood pressure cuffs, automated blood pressure cuffs are available.
  - Stethoscope
- How to measure blood pressure
  - Select the appropriate sized blood pressure cuff based on arm or leg circumference size.

CUFF SIZE	INTENDED INDIVIDUAL
10-19cm	Infant
15-21 cm	Child
22 - 26cm	Small Adult
27-30cm	Adult
35-44cm	Large Adult
45-52cm	Adult Thigh

- Position the cuff directly onto the skin. Avoid clothing acting as a direct barrier
- The persons should be positioned comfortably (considerations based on the need for taking measurement)
- If seated, the tested arm should be resting at a height equal to that of the heart (mid-point of the sternum)
- The legs should remain uncrossed
- The patient should be instructed to relax as much as possible and not talk while taking a blood pressure measurement
- If repeating, wait 5 minutes before re-testing

BLOOD PRESSURE CATEGORY	SYSTOLIC (MMHG) [UPPER#]		DIASTOLIC (MM HG) [LOWER #]
Normal	Less than120	And	Less than80
Pre-Hypertension	120-139	Or	80-89
High Blood Pressure(Stage1)*	140-159	Or	90-99
High Blood Pressure (Stage2)*	160-179	Or	100-109
Hypertensive Crisis (Emergency Care Needed)	Higher than180	Or	110

*Persons with high blood pressure (systolic pressure greater than 140 and/or diastolic pressure greater than 90) should be evaluated and cleared for participation by a licensed physician

Measuring Blood Pressure for Children

- Children
  - Ensure to use an appropriate sized cuff for the individuals
  - Do not over inflate the cuff
  - Measure twice and average the 2 measurements
  - Hypertension in children and adolescents is defined as systolic and /or diastolic blood pressure that is consistently equal to or greater than the 95th percentile of the blood pressure distribution (based on age, sex, height)

TEMPERATURE

Normal body temperature is 98.6˚ F. Changes in body temperature can be reflected in the skin.

SKINTHATIS:	MAYINDICATE:	ACTION TOTAKE:
Hot and dry	Fever, infection	Activate Emergency Action Plan
Cool and clammy	Shock, heat exhaustion	Activate Emergency Action Plan
Cool and dry	Hypothermia	Activate Emergency Action Plan

- Numerous means of measuring temperature are available, some more accurate than others.
- Oral
  - One-minute or longer is required
  - Placed correctly under, or on top of the tongue
- Axilla (armpit)
- Tympanic (ear)
  - Must be placed correctly in the ear
  - Must be dry prior to taking
  - The tip may require temperature normalization
- Forehead
- Rectal
  - Recommended for truly assessing core body temperature
  - Requires proper equipment, and training prior to assessing
  - Check with your state and local guidelines for assessing rectal temperature

- Considerations when measuring temperature
  - Recent consumption of food or drink
  - Physical exercises
  - Environmental conditions

PUPILS

How pupils react to light indicates injury severity. Abnormal pupillary response may indicate shock, drug overdose, head injury, or unconsciousness.

Normal functioning pupils should be:

- Equal size (if pupillary asymmetry was not diagnosed in pre-participation physical examination)
- Round
- Responsive to light
- Pupils should contract (shrink) when light is applied and dilate (widen) when light is removed.
- It is important to know if the athlete is wearing contacts as they will affect pupil response.
- Unresponsive pupils or any abnormal appearance may indicate serious injury such as brain damage.
- Other injuries affecting pupillary response include heat stroke, shock, severe bleeding, drug overdose, and eye trauma.

STATE OF CONSCIOUSNESS

- A person is said to exhibit normal consciousness when he or she is alert and aware of his or her surroundings.
- A change in consciousness may range from mild confusion to complete unconsciousness.
- Mental status is evaluated by asking questions concerning time, place, person, and purpose. (See Module 6 for more detail)
- Changes in the state of consciousness can be altered due to previous or current medical conditions, allergic reactions, medication, extended exposure to environmental factors (heat and cold weather) illegal drug usage, or sustained due to an injury.

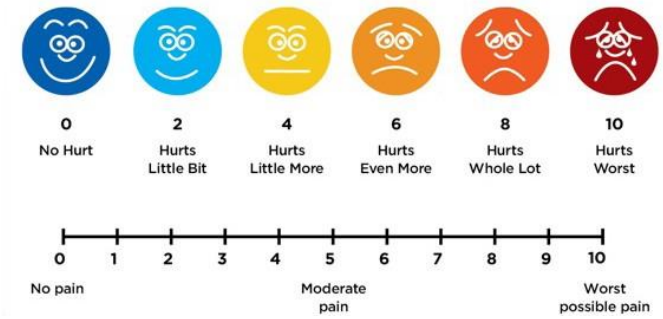
TIME-OUT!

If an athlete has a head injury, that athlete may also have a neck injury.
If an athlete has a neck injury, that athlete may also have a head injury.
These hold true until proven otherwise.

PAIN

Pain is a normal response following injury or illness. It is important when evaluating injury to note the location of pain, type of pain (i.e. achy, burning, throbbing, radiating, tingling, etc.), and pain scale.

- Pain should be graded by the individual. It is common to use a 0-10 scale, with 0 being no pain at all, and 10 being excruciating pain requiring emergency room attention.
- A scale utilizing different facial expressions, i.e. happy, neutral and sad, can be used



Gupta, G., et., al. 2010 Clinical aspects of acute post-operative pain management & its assessment. JAPTR.1(2). Pp.97-108. Figure 5: Visual Analogue Scale

When evaluating an injury or unconsciousness person, you may need to elicit a pain response (i.e. pinching them).

- Normally the athlete will respond to a painful stimulus such as pinching on the lower neck, leg or arm.
- Burning or tingling in arms or legs, with or without movement, may indicate a nerve injury.
- An athlete's negative response to a painful stimulus indicates a possible serious condition requiring the Emergency Action Plan to be activated.
- Normal response may include
  - Verbal
  - Active (i.e. a pulling back motion)
  - Visual

A serious condition/injury may be present if no response (verbal, active and/or visual) is elicited following external stimulation (i.e. a pinch), requiring activation of the emergency action plan

EMERGENCY CONDITIONS

Sudden Cardiac Arrest (SCA) and Sudden Cardiac Death (SCD)

- Sudden Cardiac Arrest (SCA) is defined as a sudden, unexpected loss of heart function, breathing and consciousness.
- Sudden Cardiac Death (SCD) is defined as a death which is abrupt, unexpected, due to a cardiovascular cause, whether congenital or from external trauma.
- Heart disease is the leading cause of death in the United States.
- Each year, an approximate 600,000 will pass away from heart disease, with another 200,000-450,000 suffering from sudden cardiac arrests episodes throughout the United States.
- The American Heart Association estimates approximately 95% of all persons suffering from Sudden Cardiac Arrest will die before reaching the hospital.
- Sudden Cardiac Death in young athletes caused by trauma is commonly associated with a blunt trauma to the chest/ heart region (22%), such as in cases of Commotio Cordis (3%).
  - Commotio Cordis
    - If the sudden death of an individual is a result of a chest impact, Commotio Cordis may instead be the cause of death.
    - Most commonly occurs in athletes between the ages of 8 and 18
    - Occurs most frequently in baseball, softball, ice hockey, football, soccer, and lacrosse
    - With a high incident of death following trauma, survivability has been reported in only 28% of cases. Of survivability cases, proper recognition with resuscitation was given within three-minutes of incident, and when available, defibrillation was administered early by an
    - automated external defibrillator (AED).

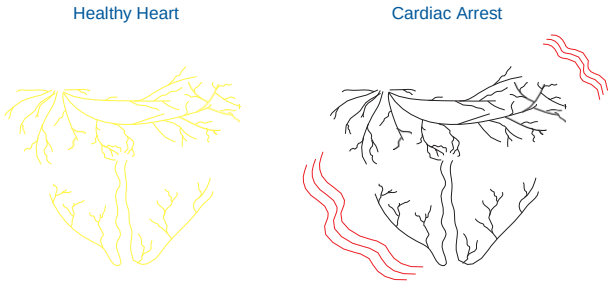
SHOCK

Refers to a state of collapse and failure of the cardiovascular system that leads to inadequate circulation, resulting in organ and soft tissue failure and eventually death if untreated.

- Shock results when the body diverts blood flow from the extremities in an effort to save vital organs.
- Sometimes an injury that seems minor to you (laceration, sprained ankle, etc.) may cause an individual to go into shock.
- Causes of shock include:
  - Respiratory failure
  - Acute allergic reaction
  - Infection
  - Injury

Signs and Symptoms

- Anxiety
- Restlessness
- Feeling of impending doom
- Altered mental status
- Weak, rapid or absent pulse
- Shortness of breath
- Capillary refill in infants and children is longer than 2 seconds



Treatment

- Activate the EAP
- Position comfortably
- Maintain/manage the airway
  - Administer oxygen if available and properly trained
- Monitor vitals (recorded every 3-5 minutes)
- Elevate the: (NOTE: if you suspect fracture or spine-related injuries, stabilization takes priority)
  - Head (If the face is red…raise the head)
  - Legs (if the face is pale…raise the tail)
- Maintain body temperature (cover with blanket if needed)
- Manage any bleeding or body injuries
- If anaphylactic, (allergic reaction) follow athletes individual plan of medical care
- Do not give the person anything to eat or drink

PARALYSIS

- …is a condition in which a person is unable to consciously move a part of the body.
  - …indicates serious injury requiring extreme care.
  - …should always be suspected until proven otherwise.
  - …in both arms and legs may indicate neck injury.
  - …on one side of the body may indicate brain injury, stroke, or pinched nerve.
  - …in the lower extremities, while maintaining movement in the upper extremities, may indicate spinal injury below the neck.

Suspected Paralysis

- Activate your Emergency Action Plan
- Do not move the athlete or remove any equipment unless a life threatening condition exists.
- Maintain the athlete's vital signs until treated by a medical professional.

Other conditions such as Asthma, Allergic Reactions, Seizures, Diabetes and Sickle Cell can require emergency care if not managed appropriately.

EMERGENCY SIGNS AND SYMPTOMS

Pupils those are not responsive to light

- May indicate heat stroke, shock, drug overdose, or a brain injury

Chest pain

- May indicate a heart condition, particularly if associated with the left arm. (Occasionally athletes may have an undiagnosed, and therefore, unknown heart condition.)
- Pain may result from a direct blow to the chest
- An athlete may also have fluid in the chest

Loss of motion

- May indicate an injury to the spinal cord, the neck, or a nerve. (There may be numbness, tingling, or loss of strength.)

Nausea

- May indicate an illness, heat-related event, gastrointestinal injury, or possible head injury. (Nausea is not a normal reaction to exercise.)
- An athlete who reports being hit in the head and complains of nausea should be removed from activity immediately and seen by a physician.

Loss of vision

- May indicate a blow to the head or to the eye itself, or an embedded object in the eye.

Loss of consciousness without apparent injury

- May indicate disease, allergic reaction, environmental conditions, diabetes, heart rhythm problems, or seizures.

Uncontrolled external bleeding

- May indicate a laceration or avulsion injury
- May indicate a fracture that breaks the skin (compound fracture)

Numbness and tingling

- May indicate a neck injury, especially if there are also complaints of neck pain, loss of strength, or loss of movement

Paralysis

- Indicates a serious injury

Continued testicular pain

- May indicate a serious injury. (If the pain does not clear in 5-10 minutes, the athlete should be removed from activity immediately and seen by a physician.)

Facial trauma

- May indicate a laceration with severe bleeding requiring stitches. (Swelling could result in difficulty breathing through the nose.)

Abdominal pain

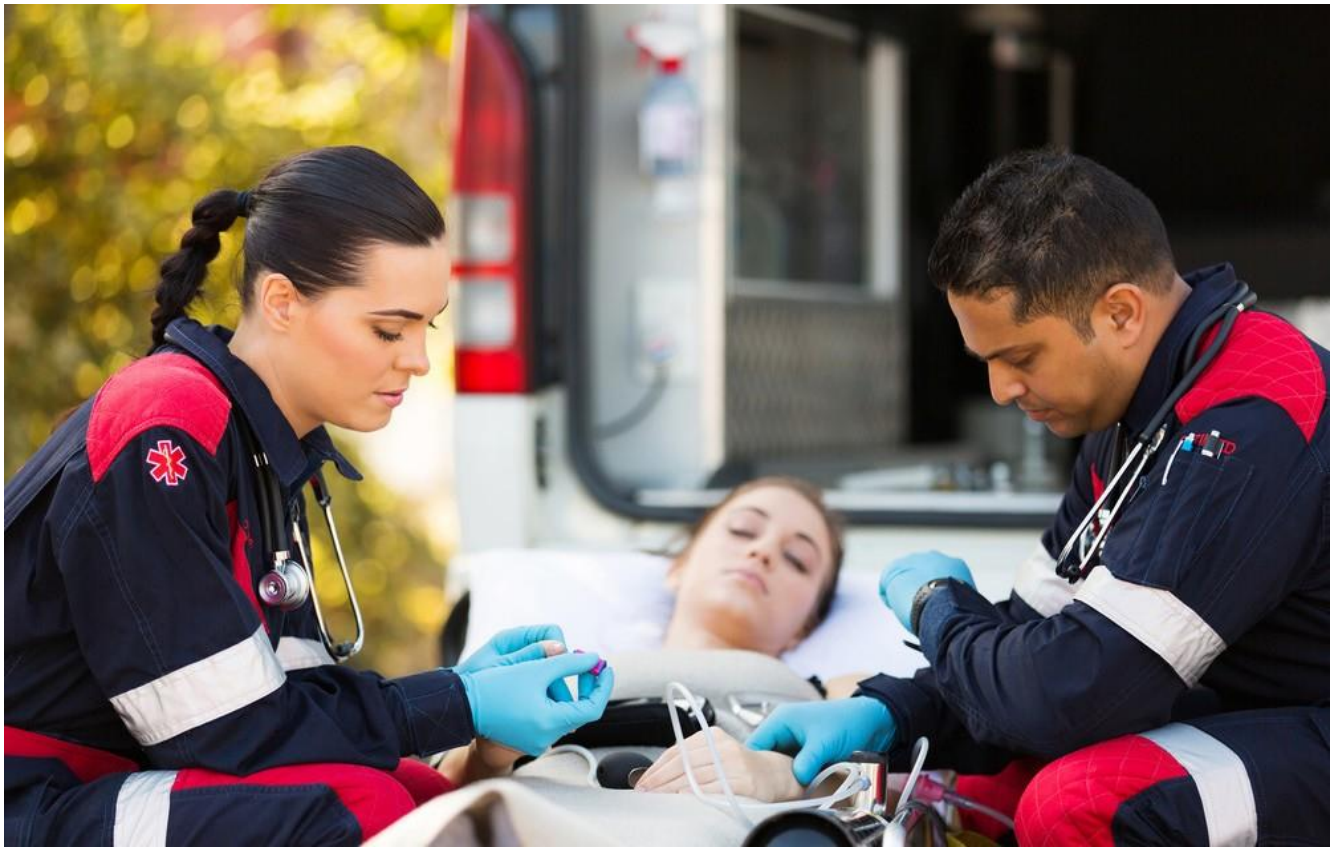
- May indicate a serious internal injury resulting from a direct blow.
- May indicate an injury to the spleen – possible "Kehr's sign," pain in left shoulder or bruises to abdomen.

Bleeding out of the ears, nose or rectum

- May indicate a serious injury or disease process. Any bleeding should be referred to a physician for further evaluation and treatment. (A physician should evaluate an athlete who has fluid draining from the ear or the nose, especially following a blow to the head. This could indicate a problem in the brain.)

SUMMARY

- Have an appropriate emergency action plan for managing emergency injuries
- It is important to recognize the vital systems of the body (pulse, respiration, blood pressure, temperature, skin color, pupils, state of consciousness, pain)
- C-A-B = Chest Compressions, Airway Breathing
- Commotio Cordis occurs most commonly in athletes between the ages of 8 and 18, and in sports such as baseball, softball, ice hockey, football, soccer and lacrosse. Survivability during Commotio Cordis becomes greater when it is recognized and when early defibrillation (AED) was administered within three-minutes of an incident.
- Shock results when the body diverts blood flow from the extremities in an effort to save vital organs.
- If you suspect paralysis, DO NOT MOVE THE ATHLETE.



MODULE 4

MEDICAL CONSIDERATIONS AND PRE-EXISTING CONDITIONS

PURPOSE

- Understand the importance of the pre-participation exam (PPE)
- Identify and take appropriate action in managing athletes with pre-existing conditions (allergic reactions, asthma, diabetes, sickle cell, seizures, solitary organ)

MEDICAL CONSIDERATIONS

- Seizures (convulsions)
- Asthma
- Allergic reactions
- Diabetes
- Sickle cell

TIME-OUT!

It is important to have a medical history on each athlete. This is a part of the pre-participation physical examination.

PRE-PARTICIPATION PHYSICAL EXAMINATION (PPE)

PURPOSE:

The pre-participation physical examination (PPE) is the first information received on an athlete and is a vital part of all sports programs. Sometimes the PPE is referred to as a physical.

The purpose of the PPE is to identify athletes who may be at risk for injury. The examination provides basic medical information that will be valuable should an injury occur. Additionally, the examination may reveal conditions disqualifying an athlete from competition. Your healthcare provider should understand the demands and complexities of the sport in order to make appropriate recommendations regarding the athlete's health and wellness. It is important for this information to be collected and reviewed annually in order to note any changes (communication, medical, etc.) on the athlete.

What is Included?

The pre-participation screening should include:

- Medical & Family History
- General Medical History
- Physical Examination
    - Orthopedic Screening
    - Cardiovascular Assessment
    - Neurologic Assessment
- Wellness Screening

Sports programs should receive permission from the athlete's parents before submitting an athlete to the screening process.

Referral

The PPE is a screening process and any medical condition found during the process should be sent to a medical specialist for further evaluation.

Medical Card

A medical history card having emergency contact information will be produced from the results of the PPE. Cards will be issued for every player, giving the coach access to vital information should an injury occur.

This information card should contain the following:

- Past illness or injury
- Present medications
- Any known allergies
- Any special medical conditions the athlete has such as asthma, diabetes, etc.
- Emergency contact numbers for parents and relatives, including home, work, and cell phone numbers
    - Any necessary release forms and insurance forms

You should not talk to others about an athlete's medical history or condition, nor should an athlete's medical information (including the emergency information card) be left where others can read it.

Please visit the American Academy of Family Physician's website at www.aafp.org to view a Pre-Participation Physical Examination Form.

http://www.aafp.org/dam/AAFP/documents/patient_care/fitness/ppephysicalexamform2010.pdf

PRE-EXISTING CONDITIONS

PURPOSE

The top four non-traumatic causes of death involving athletics includes cardiovascular conditions, hyperthermia (heatstroke), acute rhabdomyolysis related to sickle cell trait, and asthma. Athletes participating in your league/ sport in some cases, may have medical conditions requiring a specific treatment plan and plan of action should something occur during activity, while others may first initially exhibit signs and symptoms during activity. In either case, league administrators and coaches should be aware of these medical conditions in order to better recognize and initially manage these conditions. Athletes with any current medical condition(s) should have an individual plan of care in order to help league administrators and coaches better handle any situation and to maintain a safe playing environment for the athlete(s), and for those around them. As the health of the athlete(s) changes, some of the more prevalent pre-existing conditions include but are not limited to:

- Seizures
- Asthma
- Allergic Reactions
- Sickle Cell
- Diabetes
- Solitary Organ

SEIZURES (CONVULSIONS)

- A seizure is a sudden change in electrical activity in the brain and nervous system. A seizure affects how the person looks, acts or functions.
- Seizures, epilepsy and convulsions are not the same thing.
  - A seizure is an event.
  - Epilepsy is the disease involving recurrent, unprovoked seizures.
  - Convulsions refer to the person's body shaking rapidly and uncontrollably.
- Epilepsy is the 4th most common neurological disorder affecting people of all ages, genders and ethnicities, and is the most common type of seizures occurring in athletics.
- Depending on the treating physicians and medication(s), people with seizures can, and do participate in sports and activities.
- An epileptic seizure is the temporary occurrence of signs and/or symptoms due to abnormal excessive or synchronous neural brain activity.
- While there are several types of seizures, they are generally categorized as two types:
  - Generalized (local)
  - Partial (focal)

Seizure Signs and Symptoms

In most cases symptoms suddenly appear; however, in some cases the person may report the feeling of oncoming symptoms immediately before they occur.

- Generalized (Local)
  - Unconsciousness
  - Convulsions
  - Muscle stiffness
  - Brief loss of consciousness
  - Sporadic/isolated jerking movements
  - Repetitive jerking movements
  - Loss of muscle tone

- Partial (Focal)
    - Jerking
    - Muscle stiffness
    - Muscle spasms
    - Unusual sensations effecting vision, hearing, smell, taste or touch
    - Memory or emotional disturbances
    - Dilated pupils
    - Sweating
    - The athlete may 'zone out' and become unresponsive
    - They may become unresponsive to painful stimulation
    - Unusual movements such as lip smacking, chewing, fidgeting or other repetitive, involuntary but coordinated movements
    - Changes in consciousness

Triggers for seizures

There are numerous causes that may trigger to have a seizure. Some general triggers include:

- Missed medication
- Lack of sleep or disrupted sleep
- General illness (with and without fever)
- Psychological stress
- Alcohol use
- Recreational drug use
- Over the counter medication
- Nutritional deficiencies
- Poor eating habits
- Dehydration
- Hormonal changes
- During menstruation
- Flashing lights or patterns (i.e. strobe light)
- Specific activities, noises or foods

Risk Factors

- Babies who were born small for their age
- Head injuries
- An injury resulting in bleeding in the brain
- Serious brain injury or lack of oxygen to the brain
- Infections of the brain
- Conditions with intellectual and developmental disabilities
- Family history of epilepsy or seizures

Seizures and Athletics

- Depending on the treating physician's recommendation, people with seizures can participate in sports and activities.
- Some modifications may be warranted in order to provide a safe playing environment. League officials should work with National and International Associations (i.e. Epilepsy Foundation, etc.) to create a safe environment for all athletes.
    - Provide ample and readily available fluid
    - Monitor for weather changes (heat, humidity, etc.)
    - Athletes wanting to play contact sports such as football, soccer, hockey, etc., should not be precluded from activity. However, the risks of participation of the athlete or others if a seizure were to occur should be discussed, and a plan of action should be created for the management of seizures should they occur during practice or play.
    - If the decision has been made to allow them to participate, the individual should be informed of the short- and long-term risks.
- During water- based sports, (swimming, diving, water polo, etc.), athletes should be supervised. Scuba diving is not currently recommended.
- Sports involving heights should be evaluated on a case-by-case basis.

TIME-OUT!

Seizures may occur 15 minutes to three hours following activity.
Always monitor an athlete prone to having seizures.

ASTHMA

- An asthma attack may be brought on by an allergy, respiratory infection, exercise, rapid weather change or irritants such as smoke or smog.
- A medical release form provides documentation of the athlete's condition.
- There should be a treatment plan to help manage an athlete with asthma.
- The athlete should have appropriate treatment readily available should he or she have an attack.

1. Asthma is a chronic inflammatory disorder of the airways, characterized by variable airway obstruction and bronchial hyper responsiveness, causing the airway to become smaller and breathing to become difficult.
2. Asthma can be stimulated/triggered by:
    - Allergens (i.e. pollen, dust mites, animal dander)
    - Pollutants (i.e. carbon dioxide, smoke, ozone)
    - Respiratory infection (i.e. cough, cold, bronchitis, etc.)
    - Medication such as aspirin, non-steroidal anti-inflammatory drug
    - Inhaled irritants (i.e. cigar/cigarette smoke, house hold cleaning supplies, pool cleaning chemicals)
    - Pollutant exposure (ambient air pollutants, ice rink pollutants)
    - Cold exposure
    - Rapid weather changes
    - Exercises
3. Asthma is classified based on severity
    - Mild Intermittent (Nighttime symptoms less than 2 times/month)
    - Mild Persistent (Nighttime symptoms greater than 2 times/month)
    - Moderate Persistent (Nighttime symptoms greater than 1time/month)
    - Severe Persistent (Nighttime symptoms are frequent)
4. An individual emergency action plan for asthmatic athletes may include:
    - Emergency Contact Information
    - Known Stimulus
    - Peak-flow range
    - Daily Medication Plan
    - Emergency Inhaled Medication (times, frequency, method)

Signs and Symptoms of Asthma

An athlete having an asthma attack will have one or more of the following symptoms:

- Difficulty breathing
- Chest tightness
- Sweating
- Paleness
- Anxious appearance
- Bent over body
- Coughing and wheezing

Management of Asthma

- Reassure the athlete.
- Encourage the athlete to take deep, slow breaths.
- If a known environmental factor triggered the attack, remove the athlete from the area.
- Activate Emergency Action Plan if other procedures are unsuccessful
- Have athlete use their rescue inhaler.

A medical emergency must be declared if:

1. The athlete does not have an inhaler -or-
2. The athlete uses an ineffective inhaler

INHALERS

- All inhalers are not the same. An athlete should use only his or her prescribed inhaler.
- An athlete must self-administer the inhaler since each may require a specific technique.
- Insist that an athlete's prescribed inhaler be brought to all practices and games.
- Some asthma inhalers require the use of a spacer. Research has shown that using a spacer provides a more effective dosage of the needed medication.

Exercise Induced Asthma (EIA)

- EIA is triggered by physical exercise.
- EIA is most likely to occur:
  - When the weather changes
  - When the pollen count is high
  - In highly polluted areas and/or where smoke is present
  - When the athlete has a viral infection such as a cold or upper/lower respiratory infection
- As exercise becomes more strenuous, the likelihood of an attack increases. Activities should be monitored when conditions are present.
- While symptoms can occur throughout exercises, symptoms generally begin 5-8 minutes after sufficiently intense exercise starts.

Symptoms will be similar to that of asthma and include:

- Shortness of breath
- Coughing
- Chest tightness
- Wheezing
- Decreased tolerance during exercise

TIME-OUT!

Signs, symptoms, and management of EIA are the same for asthma.

ALLERGIC REACTIONS

- An allergic reaction is the body's immune response to a foreign substance (allergen).
- The allergic reaction itself can range in severity, depending on the object, sensitivity and contact amount, and can range from non-life-threatening to life threatening.
- Anaphylaxis is a serious, lift-threatening allergic reaction requiring immediate medical attention.
- Signs and symptoms can typically manifest within 5 to 30-minutes following contact with the specific
- allergen that the athlete is allergic too. In some cases, you may notice symptoms arising an hour following contact.
- The most common allergic reactions are caused by food, insect stings, medication and latex. Other known allergens include:
    - Pollen
    - Dust
    - Animal dander
    - Mold
    - Medication

Signs and Symptom of Allergic Reactions

- Watery eyes
- Red skin/rash
- Vomiting
- Diarrhea
- Cramping
- Wheezy
- Anxious
- Nervous
- Itching and Burning
- Hives
- Swelling of the lips, tongue, and airway
- Chest tightness
- Difficulty breathing
- Occasionally, respiratory failure

Management of Allergic Reactions

- Every athlete with a known adverse reaction to a substance should have an individual emergency action plan.
- In cases where the person is unaware of the allergen (substance causing an allergic reaction), have an emergency action plan that can help them recognize signs and symptoms and treatment following contact with the allergen.
- Activate the emergency action plan
- An injection of epinephrine (Adrenaclick, Auvi-Q, EpiPen, etc.) may be required for the management of allergic reactions.
- This injection of epinephrine should be administered by a trained individual, guardians, or someone designated by the parent of the athlete.

DIABETES

- Diabetes is a metabolic, chronic, life-long disease, marked by high levels of sugar in the blood.
- When blood glucose levels suddenly rise or fall, an attack may lead to unconsciousness, coma, or even death.
- The primary goal of diabetes management is to consistently maintain blood glucose levels without causing undue hypoglycemia.
- Athletes who are 'in-touch' with their body and blood glucose level are better able to maintain their blood glucose levels.
- There is currently no cure for diabetes, but rather treatments that help control and maintain blood glucose levels.
- Numbers will range for individuals:
    - Near-normal blood glucose levels should be between 100-180 mg/dL
    - When blood glucose levels have reached 180 mg/dL, it is considered high
    - When blood glucose levels fall below 70mg/dL, it is considered low
- There are two main types, Type I and Type II
    - Type I
    - Type II
- The body does not produce enough insulin to properly control blood sugar levels
- Previously known as juvenile diabetes
- The body does not respond correctly to the insulin produced by the body
- Currently the most diagnosed type of diabetes

Hyperglycemia - also known as high blood sugar

Signs and Symptoms

- Sores that won't heal
- Deep, forceful breathing
- Fruity smelling breath
- Nausea and/or vomiting
- Thirst (can be excessive)
- Frequent urination
- Dry Mouth
- Fatigue
- Blurry vision
- Weight changes (loss)
- Flushed skin
- Mental confusion
- Coma
- Death

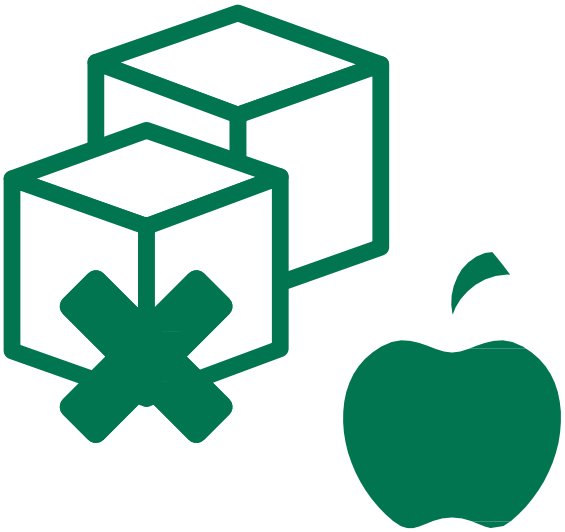
Management of Hyperglycemia

- Follow the athletes diabetic plan of action
- Have the athlete check their blood glucose level
- Injection must be performed by the athlete, parent or guardian, or a trained medical professional.

Hypoglycemia - also known as low blood sugar

Signs and Symptoms

- High heart rate
- Sweating
- Palpitations
- Hunger
- Nervousness
- Headache
- Trembling
- Dizziness
- Blurred vision
- Fatigue
- Difficulty thinking
- Abdominal breathing
- Loss of motor control
- Aggressive behavior
- Confession
- Unconsciousness
- Coma
- Death



Management of Hypoglycemia

- Follow the athletes diabetic plan of action
- Have the athlete check their blood glucose level
- The athlete may need candy, juice or sugar product as part of their plan

TIME-OUT!

When in doubt – give sugar. If athlete does not respond to treatment call 911 and activate Emergency Action Plan (EAP).

Diabetic Supplies

- A copy of the specific diabetic's plan
- Blood glucose monitoring equipment and supplies
- Supplies to treat hypoglycemia including sugary foods and/or glucagon injection kit Supplies for urine or blood ketone testing
- A sharps container that can be sealed Spare battery
- Spare parts for pumps (tubes, reservoirs, etc.)

Traveling with a diabetic athlete

Driving

- All supplies and equipment should be readily available, and not packed in a bag or underneath the bus
- All testing kit, strips and lancets
- Proper treating medication
- Cleaning material such as alcohol swabs/wipes
- Extra battery
- Proper storage or syringes and Needles

Flying

- The diabetic athlete or guardian should notify airport security/TSA of their medical condition.
- All medication, supplies and equipment should be in a sealed bag and properly labeled.
- An unlimited number of unused syringes when accompanied by insulin or other injectable medication
- Lancets, blood glucose meters, test strips, alcohol swabs and meter testing solution
- Insulin pump and supplies such as cleaning agents, batteries, plastic tubing and infusion kit catheter and needles
- Glucagon emergency kit which is clearly identified and labeled
- Ketone testing supplies

SICKLE CELL

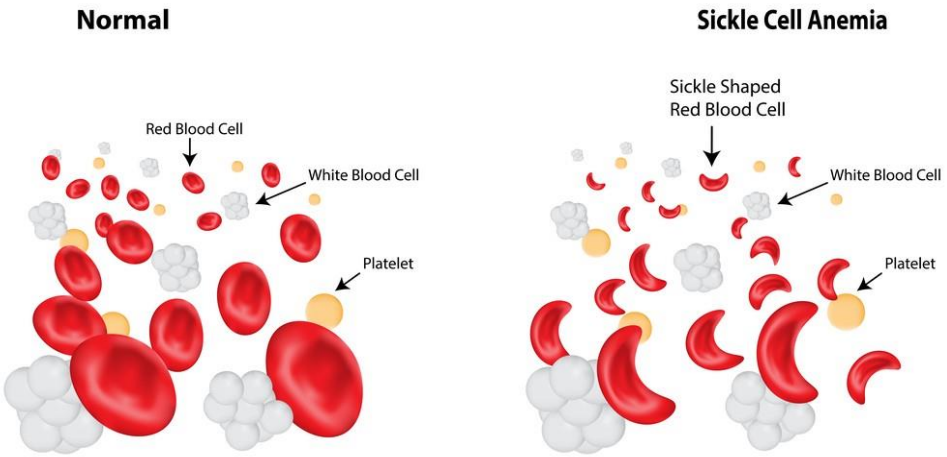
Sickle cell (trait, disease, etc.) is an inherited blood disorder, which can cause serious problems during exercise.

Sickle Cell Trait (SCT)

- The condition in which a person has inherited an abnormal gene from one parent, but usually does not display the severe symptoms of the disease. Unfortunately, symptoms can be brought on by exercise and dehydration in combination with environmental factors (ambient heat, humidity, higher altitude, etc.)
- Sickle Cell trait is not a disease.
- Sickle Cell trait cannot turn into the disease.
- Sickle Cell is the leading cause of sudden death for African-Americans in organized sports.
- People with SCT may be asymptomatic and unaware that they carry the gene.

Sickle Cell Anemia

- Sickle Cell Anemia is the most common type of sickle cell disease (SCD).
    - The condition in which two abnormal genes are present
    - People typically display symptoms at a younger age
- Is a genetic life-long blood disorder characterized by red blood cells that assume an abnormal, ridged sickle shape
- Sickling of these red blood cells causes red blood cells to breakdown prematurely, leading to the lower than normal level of red blood cells (anemia).
- Sickle cell disease is aggravated by heat, dehydration, altitude and asthma.
- In cases of sickle cell, as the red blood cell begin to sickle, they can become 'log jammed' in small blood vessels and organs causing damage to the effected tissue such as the lungs, kidney, spleen and brain.
- Damage to critical organs (heart, lungs, brain) can lead to organ failure and/or death.
- Babies born in the United States should be tested in the hospital for sickle cell status.
- Athletes with sickle cell can participate in sports.
- A sickling crisis can commonly be confused with cardiac disease and/or heat-related illness.



Signs and Symptoms of Sickle Cell

- Muscle cramping (common in the legs and/or lower back)
- Pain
- Swelling
- Weakness
- Tenderness
- Inability to catch ones breath/breathing difficulties
- Fatigue

Treatment of Sickle Cell

- Once signs and symptoms begin, the athlete should immediately stop, and withdraw from activity.
- If oxygen is available onsite, it should be administered (high-flow rate at 15 L/min) with a non-rebreather face mask.
- Monitor the vital signs. If vital signs decline, a medical emergency must be declared.
- Cool the athlete down if necessary (shade, AC, fans, etc.)
- If the person has a sickling collapse, they should be treated as a medical emergency and not return back to play.

Sickling Crisis vs. Cardiac Collapse

- Cardiac collapses tend to be instantaneous, whereas a sickling crisis is commonly associated with other symptoms (cramping, pain, difficulty breathing, etc.).

Predisposing Risk Factors of Sickle Cell

- The sickle cell gene is present most commonly in people of African, African-American, Mediterranean, Middle Eastern, Indian, Caribbean, South American and Central American decent.

Environmental Risk Factors of Sickle Cell

- Ambient Heat
- Humidity
- Higher altitude

Precautionary Measures for Athletes with Sickle Cell

- Set their own pace
- Engage in a slow, and gradual pre-season conditioning regimen to be prepared for sports-specific performance testing and the rigors of recreational and competitive athletics
- Build up their intensity slowly while training
- Use adequate rest and recovery between repetitions, especially during ‘gassers’, ‘suicides’ and intense station conditioning.
- Not be urged to perform all out exertion of any kind beyond two to three minutes without a breather
- Should participate in some form of year - round condition/training/playing to help improve acclimation
- Be excluded from performance tests such as serial sprints, or timed runs/sprints, especially if they are not a normal sport activity/conditioning/training.
- Stop activity immediately upon struggling or experiencing symptoms such as muscle pain, abnormal weakness, undue fatigue or breathlessness
- Stay well hydrated at all times, especially in hot, humid and/or higher altitude conditions
- Maintain proper asthma management
- Refrain from extreme exercises during acute illness, if feeling ill, or while experiencing a fever
- Access supplemental oxygen when experiencing unusual distress is recommended
- Seek prompt medical care when experiencing unusual distress

Return to Play following a Sickle Cell Episode

- Depending on the athlete's individual plan of medical care, the athlete may return to activity following non-fatal sickling or may be disqualified until further evaluation is completed.
- If the athlete suffered from a sickling collapse, the athlete should be medically cleared prior to any return to activity. The treating physician may require more time away from activity, a particular return to play progression back into activity, as well as other precautions.

Heat illness vs Sickling crisis:

- Heat cramps and heat illnesses were reviewed in module 2 (Environmental Concerns)
- When could signs and symptoms begin?
  - Heat Cramps- While heat illnesses can begin at any point of outdoor activity (varying based on environmental and non-environmental factors and hydration status), heat illness usually occurs following moderate but still intense bouts of exercises, usually more than 30 minutes in duration.
  - Sickling- can begin within 2-3 minutes to the first 30-minutes of activity (repetitive, no break, moderate to high intensity, timed runs, etc.)
- How is the athlete acting?
  - Heat Cramps- the athlete appears in pain, maybe rolling around on the ground, holding the cramping muscle (visibly knotted, rock-hard muscle)
  - Sickling- may not appear in a great deal of pain, but they are reporting pain and cramping
- How fast does the athlete respond?
  - Heat Cramps- requires a longer recovery
  - Sickling- if recognized and managed/treated early, they will recover quicker
- What is the core body temperature?
  - Heat illness- has an increase in core body temperature (see module 2)
  - Sickle cell- Little to no raise in core-body temperature

Management of Athletes with Sickle Cell

1. Buildup exercise and intensity slowly, pace the progressions, and allow for longer periods of rest and recovery between repetitions.
2. Athletes should participate in year-round physical activity and strength and conditioning that meets the needs of their chosen sport(s). Those athletes participating in repetitive high - speed sprints and/or interval training (exercises that build up lactic acid in the muscles) should be allowed longer recovery periods between repetitions, as such conditioning activities do pose a special risk for these athletes. Athletes with sickle cell trait should be excluded from performance tests such as serial sprints, mile runs, etc. as several deaths have occurred in this setting.
3. When symptoms appear, stop the activity. Symptoms include 'cramping', pain, swelling, weakness, tenderness, inability to 'catch their breath', and fatigue.

SOLITARY ORGAN

All of the organs in the body have a particular function(s). The body contains both singular (heart, liver, spleen, pancreases) and paired organs (eye, lungs, kidneys and testicles). In some cases, an athlete may only be born with a single paired organ or, have lost a paired organ from an acute injury (motor vehicle accident, fall, hit, etc.).

- Parents/guardians and the athlete need to understand the risk of participating in any sport with only a single paired organ.
- Depending on the demands of the sport (contact vs. non-contact) consideration for potential injury may need to be discussed.
- In some cases, additional protective equipment may be required for athletic participation.

SUMMARY

Pre-Participation Examination (PPE)

- All coaches should be aware of athletes with known medical conditions.
- Components of the PPE can include Medical & Family History, General Medical History, Physical Examination, Orthopaedic Screening, Cardiovascular Assessment, Neurologic Assessment and a Wellness Screening.
- Coaches should have medical history cards, permission to treat and transports for each athlete, and have these readily available should the athlete's health status change.

Pre-Existing Conditions

- League administrators and coaches should be aware of common medical conditions, and be able to recognize signs and symptoms and initially manage these medical conditions.
- Athletes with medical conditions should have an individual plan of care in the event the healthcare of the athlete changes.

Seizures

- Although controllable by medication, seizures may still occur in athletes with epilepsy.
- Seizures may last a few seconds or a few minutes for major episodes.
- The most important action to take in response to an athlete suffering a seizure is to protect the athlete from a self-inflicted injury.
- Seizures, epilepsy and convulsions are not the same thing
- Seizures, are categorized as generalized (local) and partial (focal)
- People with seizures, can, and do participate in sports
- Signs and symptoms may last a few seconds to a few minutes

Asthma

- Asthma is a condition in which the air passages in the lungs get smaller, thus interfering with normal breathing.
- An athlete should only use his or her own prescribed inhaler.
- Athletes with asthma should bring their inhalers to all practices and games.
- As exercise becomes more strenuous, the likelihood of an asthma attack increases for athletes with exercise induced asthma (EIA).
- Use Benadryl or EpiPen® in life-threatening situations.

Allergic Reactions

- The most common allergic reactions in athletes are caused by insect bites or stings.
- Allergic reactions range from minor skin irritation to breathing problems.
    - Allergic Reactions
    - Anaphylaxis is a serious, lift-threatening allergic reaction requiring immediate medical attention.
    - Signs and symptoms can typically manifest quickly (5 to 30-minutes) or within an hour following the person coming in contact with the specific allergen.
    - Other common allergic reactions are caused by food, insect stings, medication and latex

Diabetes

- There are two types of diabetic conditions that can occur and their management is different.
- A diabetic coma is caused by too little insulin or high blood sugar.
- Insulin shock can be caused by low blood sugar.
- Give sugar to a diabetic athlete when in doubt of their condition.
- Call 911 and activate your Emergency Action Plan if there is no response.
- Athletes who are 'in-touch' with their body and blood glucose level are better able to maintain their

blood glucose levels.

- It is important to be able to recognize hyperglycemia and hypoglycemia signs and symptoms.
- Athletes should be able to check their blood glucose levels whenever needed.

Sickle Cell

- Sickle cell trait is the condition in which a person has inherited an abnormal gene from one parent, but usually does not display the severe symptoms of the disease.
- Unfortunately, SCT symptoms can be brought on by exercise and dehydration in combination with environmental factors (ambient heat, humidity, higher altitude, etc.)
- People with SCT may be asymptomatic and unaware that they carry the gene.
- Sickle cell disease is aggravated by heat, dehydration, altitude and asthma.

Solitary Organ

- Parents/guardians and the athlete need to understand the risk of participating in any sport with only a single paired organ.
- Depending on the demands of the sport (contact vs. non-contact) consideration for potential injury may need to be discussed.

Return to Play Guidelines

- Your athletes may have injuries or a condition that requires physician follow-up and clearance prior to return to activity.
- Follow all physician guidelines include required equipment and braces, proper progression back into activity, and any necessary follow-ups.

MODULE 5

PRINCIPLES OF FIRST AID

INTRODUCTION

First-aid is an important skill. Whether emergency or non-emergency or acute or chronic, the initial steps of care can dictate the outcome for an injured athlete.

We cannot control environmental conditions; instead, most environmental illnesses, injuries, and fatalities are preventable if certain guidelines are followed:

- Follow universal precautions when caring for an athlete.
- Distinguish between different types of wounds and how to treat them.
- Identify the signs and symptoms of a wound infection.
- Determine when to see a physician.
- Identify the signs and symptoms of a fracture and dislocation.
- Differentiate between acute and chronic injury.
- Identify when ice or heat are indicated for an injury and learn the appropriate application for each.

PURPOSE

In this module, you will learn:

- Important onsite supplies and equipment for providing care
- To apply the universal safety precautions when caring for an athlete
- To recognize different types of skin wounds
- To recognize infection
- To recognize common skin infections in athletics
- To recognize and manage fractures and dislocations
- To recognize and manage acute and chronic injuries
- To recognize situations when you should ice or heat

PROTECTING YOURSELF AND THE ATHLETE

FIRST AID KIT & EMERGENCY EQUIPMENT

- The proper individuals should know the exact location of the equipment or keep it with them at all times.
- First Aid Kit and emergency equipment should be stored in a dry environment.
- These should be checked on a regular basis to make sure all supplies and equipment are available and in working order. Used and/or expired items should be replaced.
- Medical history/information and medical release forms for all players should be readily available for use in an emergency situation.

The following items should be included in your first aid kit:

- Gloves
- Ice bags
- Gauze
- Cotton Swabs
- Contact solution
- Antibiotic ointment
- Alcohol wipes
- Hydrocortisone cream
- Insect repellant
- Tape cutter
- Athletic tape
- Hand sanitizer
- Towel
- Trash Bag
- Pen/Permanent Marker
- CPR mask/face shield
- Bandage strips (assorted sizes)
- Elastic wraps (assorted sizes)
- Eyewash
- Adhesive tape
- Antiseptic wipes
- Insect sting ointment
- Sun block
- Scissors
- Wound cleaner
- Emergency information cards
- Tools for facemask removal
- Biohazard Bags
- Note Pad

The NCSS has first aid kits with supplies for sale. If your organization needs a kit, contact the NCSS for additional information.

AUTOMATED EXTERNAL DEFIBRILLATORS (AEDS)

- Sudden Cardiac Death (SCA) Leading cause of death in the United States, affecting approximately 300,000 people each year.
- Sudden Cardiac Death is the leading cause of death amongst athletes:
  - 14 Heart Related Deaths/33 Deaths (2013)
  - 25 Heart Related Deaths/34 Deaths (2012)

An AED should be applied to an individual within 3 minutes after the athlete needs it (collapse/drop-to-shock is 3-5 minutes). Every minute after 3 minutes is associated with a 7%-10% increase of risk of death.

Expiration date on pads and battery should be checked and documented regularly.

TIME-OUT!

Automated External Defibrillator (AED)

Automated External Defibrillators (AEDs) deliver an electrical shock to the heart. The AED determines if a shock is needed and administers the shock indicated.

AEDs are commonly found in public places such as airports, airplanes, malls, fitness facilities, schools, and sporting arenas.

RECOMMENDED TRAINING

- We highly recommend every coach or trainer become certified in cardiopulmonary resuscitation (CPR). We also recommend that he/she knows how to use an automated external defibrillator (AED). This PREPARE course is not intended to serve as a CPR or AED certificate course.
- For training and certification in this area, please contact your local branch of the American Red Cross (http://www.redcross.org/lp/take-a-class) or the American Heart Association (http://cpr.heart.org/AHAECC/CPRAndECC/FindACourse/Courses/UCM_473164_Courses.jsp)
- Your sports program should provide annual updating of policies and ensure that personnel follow regulations.
- Your sports program should provide you with supplies for managing cases of open wounds and the proper supplies for clean- up following.
- Bio-hazardous waste (blood, excretion, exudates, secretions, bodily fluids and items contaminated with these) should be properly disposed of in the proper container, and not thrown away in normal trash cans.
  - Red bio-hazard container should be available for the disposal of any items not deemed 'sharps', i.e. used gauze, used bandages, bloody towels, etc.
  - Sharps containers should be available for disposal of any sharp or puncture able medical supplies (syringes, etc.)

TAKING UNIVERSAL PRECAUTIONS

It is important when managing any athletes with open wounds (minor or severe) to avoid any accidental contact with the athlete's bodily fluids (universal safety precautions). Depending on the situation, league administrators and coaches should use nonporous supplies such as medical gloves, goggles, face shields and cover gowns to prevent bodily fluid contact. When removing these safety items, extreme care should be used. At a minimum, gloves should be worn when managing any open wounds or during wound cleaning. These items should be disposed in bio-hazardous/sharp appropriate containers.

OPEN WOUND PRECAUTIONS

- Before participation, athlete must cover open skin wounds with fixed bandages.
- An athlete must be immediately removed from play to manage bleeding.
- All blood on a uniform must be removed before the athlete returns to play.
- When working with an athlete who is bleeding, you must wear gloves at all times. Hands should be washed after each procedure, with soap and water or other germicidal agent.
- Sports programs should provide proper supplies for clean up.
- Use red hazardous waste bag to keep items with blood separate from non-contaminated items.
- Sharps container should be available for disposal of any medical sharps used at venue.
- Towels or other linens that are contaminated must be bagged and washed separate from other laundry.

GLOVE REMOVAL

Gloves that have come into contact with blood or bodily fluids should be removed in a specific manner. By following this process, you will be able to remove your gloves safely without coming into contact with any blood or bodily fluids that may be on the gloves.

With both gloves on…

- Pinch the palm side of one glove (the right hand) near the wrist, and carefully pull the glove so that it is inside out in the opposite hand (left hand).
- Slip two fingers (right hand) under the glove (left hand)
- With the ungloved hand (right hand), pull the glove off, pulling it inside out

After removing the gloves:

- Dispose of the gloves in an appropriate biohazard container
- Wash the hands thoroughly with soap and water or germicidal agent

MANAGING BLEEDING

External bleeding can be controlled by following these five steps:

4. Gloves and Gauze – Supply gauze pad to athlete while you put on medical exam gloves.
5. Direct Pressure – Apply firm pressure directly over bleeding area using gloved hand(s) and sterile gauze pad. New gauze pads should be placed over blood - soaked pads and pressure increased.
6. Elevation – Elevate the injured body part above the heart.
7. Compression – Once the bleeding has been controlled using direct pressure, compression can be maintained by applying pressure with a bandage or gauze wrap.
8. Pressure Points – Used to control severe bleeding when direct pressure and elevation are ineffective, most commonly in the armpit and groin/femoral artery.

If there is excessive bleeding and these steps do not stop it after two or three minutes, activate your emergency plan.

Excessive, uncontrollable bleeding and imbedded foreign objects are medical emergencies requiring the activation of your emergency plan. (See Module 1, Emergency Action Plan).

TIME-OUT!

Internal bleeding in the abdominal area presents with nausea and firmness to the abdomen. This is a medical emergency that cannot be managed on the sidelines.

TYPES OF SKIN WOUNDS

Skin wounds are caused when the protective skin layer is damaged, resulting in a break in the skin. Once the skin surface is broken there is an increased chance for contamination of the wound, infection, and the transmission of disease from one person to another.

Wounds fall into one of the following categories:

- Abrasion
- Laceration
- Avulsion
- Puncture
- Embedded foreign objects

Abrasion

Characteristics:

- Loss of the surface of the outer skin caused by the skin being rubbed or scraped on a rough or hard object (turf burns, carpet burns, i.e. sliding into a base, strawberry, an athlete sliding on sports turf).

Laceration

Characteristics:

- Jagged edge cut that penetrates the outer skin and underlying tissue, sometimes deep enough to injure underlying muscle, nerves, or blood vessel.
- Lacerations to the face or lacerations large enough that the skin edges are open should be seen by a physician as soon as possible to determine if stitches are needed.

Avulsion

Characteristics:

- Skin is torn completely from its attachment.
- Save avulsed tissue to be reattached by a physician or qualified healthcare provider. For transport of avulsed tissue, pack in a clean plastic bag and put the bag in ice.

Puncture

Characteristics:

- Penetration of the skin by a sharp object.
- This type of wound needs to be seen by a physician for further treatment and prevention of tetanus.

Embedded Foreign Object

Characteristics:

- When an object pierces the skin, and remains in the skin.
- Needs to be evaluated by a physician immediately. Do not attempt to remove the object as this could further damage the involved tissue. Carefully surround the object (front and/or back) with gauze and wrap to support and stabilize the object from moving, and seek immediate care and treatment at the local emergency department.

WOUND MANAGEMENT

Initial Care

- Practice universal precautions
- Clean around the wound
- Apply Band-Aid/dressing
- Cover with an affixed bandage
- Depending on the wound, refer to a physician or qualified health care provider

Follow-up Care

- Practice universal precautions
- Monitor for infection (daily)
- Clean around the wound
- Apply Band-Aid/dressing
- Cover with an affixed bandage
- Instruct to remove bandage following activity, clean and recover area.
- Communicate with parent any concerns of healing or infection

Signs of Infection

- Tender to the touch
- Redness
- Body fever
- Swelling
- Heat
- Oozing of bloody fluid that may contain a white or yellow tint

A physician should immediately examine a wound displaying any of these signs.

SKIN INFECTIONS

The risk for developing skin infections in athletics may be higher than a normal population as many sports involve direct and indirect contact, sharing like items and are confined to closer spaces and environmental factors. In the competitive sports setting, more than half of all infectious disease involve the skin. Recognizing more common skin infections (Impetigo, Tinea, Cellulitis, Staph, MRSA and Herpes), proper care and management and proactive preventative steps can reduce skin infections in athletics.

IMPETIGO

- A contagious bacterial based infection classified as bullous or non-bullous.

Signs and Symptoms

- Red sores around the face and mouth are most common
- Can occur on the trunk and/or on the arms and legs
- Bullous
  - Superficial like-blisters (may be small or larger) that rupture easily
  - When they rupture, the area may be moist with a scaly rim
- Non-bullous
  - More deep like-blister (ulcer) ruptures (may occur quickly)
  - May have a yellowish/honey-colored crust

TINEA

- A fungal based infection
- Depending where they are on the body, the tinea infection may have specific names

Signs and Symptoms

- Can occur on the head, face, neck, trunk arms or legs
- A well-defined, round/circle (may not be a perfect circle) with reddish raised borders, with a possible scaly appearance
- Possible hair thinning or loss if on the head

CELLULITIS

- A bacterial based infection
- May be caused by a tiny opening in the skin or when the skin comes into contact with an allergen (see allergic reactions Module 4)

Signs and Symptoms

- Swollen
- Warm
- Tender to touch
- Redness
- May spread rapidly
- Pain
- Fever
- Possible tiny blistering

STAPH INFECTIONS

- Bacteria that can be found on the skin or in the nose
- People who have staph but are not sick are said to be "colonized."
- Colonized people may not become ill, but can still pass it to others.

Signs and Symptoms of Staph Infections:

- Small red bumps that resemble pimples
- Boils
- Insect/spider bites
- Can be red, swollen, painful, itchy
- Can have pus or other drainage

MRSA

Methicillin-Resistant Staphylococcus Aureus:

- MRSA is a type of bacteria that has become resistant to many antibiotics. MRSA is often misdiagnosed as a spider bite. Insist that your physician culture your infection for positive diagnosis.

Risk Factors

- Person-to-person contact, like contact sports (Bacteria often enter the body and can be spread through a cut or scrape.)
- Sharing towels or other athletic equipment
- Contact with items and surfaces
- Openings in the skin
- Crowded conditions (locker room)
- Poor hygiene
- Compromised immune system (surgery, illness, dehydration)

TIME-OUT!

MRSA Bacteria can live outside the body for up to 300 days.

Signs and Symptoms of MRSA

- Longer than normal healing time
- Any increase in size
- Unexplained or unusual pain or sensitivity
- The presence of pus or a pustule or drainage
- Induration (hardness)
- Sensation of heat
- Abnormal swelling or redness
- Red streaks around and leading away from the lesion
- Abnormal coloration

MRSA is often misdiagnosed as a spider bite

- Insist that your physician culture your infection for a positive diagnosis.

Control Staph Infections and MRSA

- Wash hands often.
- Shower daily.
- Use hand sanitizer.
- Keep suspicious lesions covered, clean, and dry.
- Do not share items (towels, clothing, razors, soap, athletic equipment).
- Sanitize athletic equipment and surfaces (weights, door knobs, benches, bats, etc.) with a bleach and water solution or an anti-bacterial/microbial cleaner.

How serious is Staph or MRSA?

- Most staph infections are minor and are easily treated. Without treatment they may worsen and become life-threatening. Only a medical professional should treat an infection.
- Staph may cause more serious conditions including the following:
    - Bone infections
    - Bacterial blood poisoning
    - Vegetative growths on internal organs
    - Toxic shock syndrome

Herpes (Herpes Simplex Virus HSV-1)

- A viral based infection
- Has an incubation period of 3 to 10 days

Signs and Symptoms

- Commonly found on the head, face trunk arms or legs
- A widespread cluster of tiny like-blisters with a reddish base
- Tingling
- Itching
- May have flu like symptoms (sore throat, fever, headache, body aches, weakness, fatigue, etc.)

PREVENTING AND CONTROLLING THE SPREAD OF SKIN INFECTIONS

- Educate league officials, coaches, parents and athletes on skin infections.
- Follow all guidelines for sports participation with infections
- If the athlete (per the physician's orders) is permitted to participate with the infection, all areas of infection should be appropriately covered with an affixed bandage.
- Encourage and practice good hygiene (athletes, uniforms, athletic equipment, etc.)
- Maintain and regularly clean athletic facilities (benches, locker rooms, stands, bathroom, concessions, door knobs, etc.)
- Infected clothing/uniforms should be washed separately and appropriately
- Encourage the regular washing of hands
- Bathrooms and areas around your facility (concession, benches, etc.) should have antibacterial/microbial or approved sanitizing agents
- Avoid touching the active infection
- Do not share like items (water bottles, athletic equipment, towels, soap bars, nail clippers etc.)
- Athletes should be encouraged to report any wounds to the skin or infections
- Cosmetic shaving should be discouraged
- Utilize posters or signs to remind everyone proper behavior (washing hands, etc.) and skin infections recognition (Cellulitis, Staph, MRSA, etc.)
- People who have a history of skin infections may be more prone for developing another
- Be aware of people with compromised immune systems (surgery, illness, dehydration)

BLISTERS

Blisters are usually formed by friction, such as a shoe rubbing on an area of the foot. The friction causes the outer skin layers to separate and the fluid to accumulate between the two layers of the skin. While blisters seem very minor, an increase risk for infection can occur if they are not managed properly.

Signs and Symptoms of Blisters

- Redness
- Swelling
- Fluid-filled bump
- Pain or warm sensation in the affected area

Blister Treatment

- Blister treatment is based on whether or not the outer skin is still intact or if the skin has been broken, creating an open wound.
- If the outer skin is intact, the body will eventually absorb the fluid if the blister is treated appropriately.
- Puncturing the outer skin to drain the fluid will not aid in healing, but rather creates an open wound susceptible to infection. Only a physician or certified athletic trainer should drain a blister if required.

Management of Blisters

- Clean with soap and water.
- If skin covering the blister is intact, leave it in place for several days. This will act as a protective covering over the blister.
- Apply an antibiotic ointment on the surface of the blister.
- Cover with a sterile gauze pad.
- Over the blister, place a foam pad with a hole cut in the center that is larger than the blister (a donut pad). A bandage may be used if such a pad is not available.
- Secure in place with athletic tape.
- Change bandage daily, as well as any time that it becomes wet.
- Monitor for signs of infection.

Prevention

- Wear appropriately fitting gear including gloves, shoes, socks, and padding.
- Break in new footwear gradually.
- Apply friction reducing ointment to susceptible areas.
- Stop activity and treat tender spot before it becomes a blister.
- Regularly change damp or wet socks into dry ones.

TIME-OUT!

You should not drain fluid from a blister because it can cause infection.

SPRAINS AND STRAINS

IS IT A SPRAIN OR A STRAIN? SPRAIN

- Is an injury to a ligament
- 3 grades (mild, moderate, severe)

Signs and Symptoms

- Inflammation
- Pain
- Swelling
- Bruising
- Limited ability to move the joint (near the joint)
- The athlete may report hearing a pop or snap
- Difficult weight bearing if a ligament is sprained in the lower extremity

STRAIN

- Is an injury to a muscle
- 3 grades (mild, moderate, severe)

Signs and Symptoms

- Inflammation
- Pain
- Swelling
- Muscle spasm
- Bruising
- Muscle weakness
- Difficulty or in ability to move the joint (Usually over the muscle. Can be over a joint)

Management for Sprains or Strains

- If in the lower extremity, do not bear weight. If it is in the upper extremity, a sling may be comfortable
- Minimize movement of the area of concern
- Stabilize the injured area in the position of comfort.
- Apply ice to the injured area for 15-20 minutes. Use a thin layer between the ice and the area
- Elevate the area
- Refer to a physician for evaluation and treatment

FRACTURES AND DISLOCATIONS

IS IT A FRACTURE OR A DISLOCATION? FRACTURE

- Any break in the continuity of a bone.
- While some people believe that a fracture is different than a broken bone, they are the same.

Signs and Symptoms of a Fracture

- May or may not have deformity
- Pain
- Loss of function
- Swelling
- Bruising
- Heard or felt a "pop" or "snap" at time of injury
- Grinding or grating sound, like two bones rubbing together
- Possible false motion (movement where there should not be)

DISLOCATION

- A total disruption of a joint where the bones are no longer in alignment.
- A coach or parent should never attempt to reset a dislocated joint unless they are a trained medical professional.

Signs and Symptoms of a Dislocation

- May or may not have deformity
- Swelling
- Pain
- Loss of movement
- Marked loss of normal joint movement (locked joint)
- Numbness
- Weakness

A coach or parent should never attempt to "reset" a dislocated joint. Only professionally trained persons are qualified to perform this.

TIME-OUT!

Do not pull on a finger to "unjam" it. This may cause further damage.

IS IT A FRACTURE OR A DISLOCATION?

Call 911 if:

- There is an obvious deformity
- Moderate or severe swelling and discoloration
- If the person hear a snap, pop or crack at the time of injury
- If the fracture is open (through the skin)
- If the injured person cannot move the area
- If the injured area is cold and numb
- If the injury involves the head, neck or spine
- If the person is having trouble breathing

- If it is not possible to safely or comfortably move the person into a personal vehicle

MANAGING FRACTURES AND DISLOCATIONS	
IF...	**THEN...**
You suspect a fracture or dislocation	- Activate Emergency Action Plan (EAP) (See Module 1) - Do not move the body part!
There is obvious deformity (Closed fracture - the bone has not penetrated the skin)	- Activate Emergency Action Plan (EAP) - Do not move the body part!
There is obvious deformity and broken skin. (Open fracture - the bone has penetrated the skin)	- Activate Emergency Action Plan (EAP) - Do not move the body part! - Take blood and bodily fluid precautions. - Control bleeding with direct pressure points if necessary

TIME-OUT!

Move the athlete only if he or she is in a life-threatening situation.

DIFFERENCE IN ACUTE AND CHRONIC INJURIES

ACUTE INJURIES

Description

Characterized by a rapid onset and is of short duration

Examples

An ankle sprain that just occurred

Signs and Symptoms of Acute Injuries

- Swelling
- Redness
- Heat
- Pain
- Possible loss of function
- Bruising
- Possible difficulty with bearing weight.

Caused by the body's response to injury, these signs and symptoms are normal and necessary to localize, protect, and prepare the body for healing. The magnitude of these signs and symptoms will increase as the severity of injury increases.

Management of Acute Injuries

- P.R.I.C.E.S. (Protect, Rest, Ice, Compression, Elevation, Support)
- Do not allow bearing weight or movement if it increases the pain.
- The extent of the injury is determined by the amount of tissue that is damaged.
- An athlete with an acute injury that presents with the above symptoms needs to be seen by a physician.
- Many acute injuries can become chronic if they are not treated appropriately as an acute injury.

Prevention of Acute Injuries

- Correct facility causes (a depression in the field, signage about a step up/down)
- Avoid exercises that may cause injury
- Correctly progress that's during weight training and conditioning
- Improve muscular strength and flexibility
- Improve cardiovascular conditioning
- Wear appropriate and correctly fitted equipment
- Wear additional protective equipment (ankle braces) correctly
- Teach and practice correct athletic technique

CHRONIC/OVERUSE INJURIES

Description

Characterized by a slow onset or when the injury is caused from gradual development. Overuse injuries are usually caused by constant and repetitive stresses, or prolonged activity. This type of injury can possibly last for months or even years.

Examples

- Stress fracture, tennis elbow

Signs and Symptoms of Chronic Injuries

- Swelling
- The pain does not go away or improve
- Pain increases with activity
- Numbness or tingling may exist in the injured body part
- Some loss of function
- Muscle spasm
- Possible grating or grinding

Management of Chronic Injury

- P.R.I.C.E.S. (Prevention, Rest, Ice, Compression, Elevation, Support).
- Anti-inflammatory medication, usually an NSAID (non-steroidal anti-inflammatory drug), prescribed by a physician or licensed health care provider.
- 60% of chronic injuries are the result of training errors. These underlying dysfunctions should be identified and addressed.

Prevention of Chronic Injuries

- Appropriately treat acute injuries (follow all physicians orders)
- Upon return back to activity, gradually increase activity over time using the 10% rule (increase the distance/intensity
- of training and conditioning by only 10% each week until they are fully back) This may be shorter or longer based on their physician or therapists orders.
- Avoid exercises that may cause injury
- Avoid running/conditioning on hard, non-forgiving surfaces (i.e. concrete)
- Improve muscular strength and flexibility
- Improve cardiovascular conditioning
- Wear additional protective equipment (ankle braces) correctly
- Teach and practice correct athletic technique

TIME-OUT!

There should be a proper rest and recovery time taken in between practices and/or workouts for muscles and joints to recover. This will aid in decreasing injury rates.

ICE VS. HEAT

- Never put an ice/heat pack directly over an open wound
- Do not use heat if there is an active infection
- Be cautious, as some athletes have allergies to ice/heat (see module 4: allergic reactions)
- Be cautious of using ice/heat on young athletes
- Be cautious of athletes with sensation problems (lack of or hypersensitivity)
- Be cautious of athletes with impaired circulation condition

Ice

- Causes blood vessels to constrict, reducing swelling in an acute injury, thus decreasing pain and speeding up the healing process.
- Reduces the sensation of pain.
- Reduces muscle spasm.

Application of Ice

- Fill a freezer bag (or something similar) with ice.
- Apply directly to the skin or over a wet towel if too cold.
- Leave ice in place for 15-20 minutes.
- Repeat application of ice every hour for 48-72 hours after an acute injury, or as long as swelling, redness or heat/warmth are present.
- Remove air from bag before closing to ensure a good fit.
- When using frozen gel packs, place over a wet elastic wrap or wet towel. Never apply directly to the skin which may be damaged due to the extremely low temperature and chemicals of the packs.
- Never put a frozen gel pack on a weight bearing part of the body.

TIME-OUT!

Application of ice directly to the skin can be uncomfortable at first.
The person will experience the following sensations:

- COLD
- BURNING
- ACHING
- NUMBNESS

- Ice should be applied for no more than 20 minutes at a time, repeating every hour as needed.
- The area becomes numb and pain is reduced after about seven minutes.

Heat

- Causes blood vessels to enlarge, increasing swelling in an acute injury, thus increasing pain and lengthening the healing process.
- Best treatment for injuries without swelling, redness, warmth, and acute pain. This could be a few days to several weeks after injury, depending on injury severity.
- Reduces muscle spasm.
- May aid healing process in chronic injuries by increasing the amount of blood to the area.

Application of Heat

- Do not use heat for acute injuries (at least 48-72 hours following injury)
- Most therapeutic heat packs are microwavable or electrical
- Never put these packs directly on your skin

- Put several layers between you and it
- Leave it in place for 15-20 minutes
- Never put chemical heat packs/patches on weight bearing spots (i.e. sitting or lay on it), as if the pack leaks/pops, the chemical contents could get on you and cause a chemical: skin reaction

Compression

- Assists in reducing swelling by decreasing amount of space for swelling to accumulate.
- Most commonly achieved by using elastic wraps beginning below the injured area and spiraling upwards (towards your heart), overlapping the wrap as you go.
- Periodically check skin color, skin temperature, and sensation to make sure the wrap is not too tight.
- Compression should be applied for several days following an acute injury.
- For chronic injuries, compression should be applied until all swelling is gone.
- Do not apply compression to injuries resulting from a direct blow to the front of the lower leg.

Elevation

- Elevation of the injured body part, particularly an extremity, helps reduce swelling by using gravity to assist in draining blood and other fluids from the injured area.
- The general rule is to elevate the body part above the heart.

Support

- Boots, slings, crutches, and protective bracing should be worn and used during the initial phases of healing.
- Appropriately fitted braces and supports are designed to prevent further injuries and protect the body parts from damage.
- Supports are worn to strengthen the muscles, joints, and tendons.

SUMMARY

- Always practice universal precautions when managing an open wound or when bodily fluid is present
- Abrasions, lacerations, avulsions, punctures and embedded foreign objects are different types of wounds
- If an object is embedded, it should remain in, padding and covering the object and the athlete should be sent immediately for care and treatment. Never attempt to remove the object
- An opening in the skin increases the risk for infection
- Tenderness to the touch, redness, body fever, swelling, heat and oozing of blood fluid (may be whitish or yellowish in color) are signs of infection
- MRSA can live outside the body for up to 300 days
- Never attempt to reset a dislocation. Even if it is a finger
- For acute injuries, ice up to 48-72 hours, or if inflammation is still present
- Never put heat on an acute injury (at least 72-hours following an acute injury)

MODULE 6

HEAD, NECK AND FACIAL INJURIES

PURPOSE

- Recognize the signs and symptoms of a possible neck injury.
- Recognize the signs and symptoms and appropriately manage a head injury.
- Appropriately identify and manage facial injuries.
- Learn the appropriate action to take for an athlete with a suspected head, neck or facial injury.

HEAD INJURIES

- Head injuries are a result of a direct or indirect blow to the head.
    - A direct blow to the head can occur when an object or person comes into direct contact with the head. As a result, the head may have signs of trauma such as a laceration, bruising or possible skull fracture.
    - An indirect blow to the head can occur when the person's head shakes back and forth, causing the brain to jostle within the skull. Examples would include whiplash from a car accident or being hit in the body forcing the head to suddenly rock back and forth before the athlete hits the ground. As a result, there may be no visible signs of injury as compared to a direct blow.
- Both direct and indirect injuries can cause mild-traumatic brain injuries (MTBI). This trauma to the brain (mild to severe) can cause disruptions in brain activity, tissue damage, blood vessel damage or even tissue death.
- A concussion is a subtype of mild-traumatic brain injury (MTBI). In sporting context, you may see these terms used interchangeably or more specifically referred to as a sports related concussion (SRC).

CONCUSSIONS

A sports related concussion (SRC) is a traumatic brain injury induced by biomechanical forces. Several common features that may be utilized in clinically defending the nature of a concussive head injury include:

- *SRC may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an impulsive force transmitted to the head.*
- *SRC typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, signs and symptoms evolve over a number of minutes to hours. SRC may result in neuro pathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuro imaging studies.*
- SRC results in a range of clinical signs and symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive features typically follows a sequential course. However, in some cases symptoms may be prolonged.

The clinical signs and symptoms cannot be explained by drug, alcohol, or medication use, other injuries (such as cervical injuries, peripheral vestibular dysfunction, etc) or other comorbidities (e.g. psychological factors or coexisting medical conditions).

- an injury to the brain caused by a direct and/or indirect blow causing complex changes in the brain (brain, nerves, blood flow, etc.).
- These complex changes in the brain, resulting from a concussion, can cause motor control problems, cognitive, neurological, and psychological issues, and the impairment of physical movement.
- Signs and symptoms may be present immediately following an injury, or hours following. If a head injury (direct or indirect) was observed or reported, the athlete should be evaluated, and held out and monitored for any changes in signs or symptoms.

When in doubt…hold them out.

- SRC can occur in all sports (contact and non-contact) and in all levels of sports (youth, recreational, high school, college, professional and senior level, etc.)
- The terms 'your bell rung', 'your head dinged' or 'clearing the cobwebs out' are not acceptable terminology for concussions.
- In 2013, an estimated 3.8 million concussions occurred in the United States during competitive sports and recreational activities. Up to 50% however, went unreported.
- An athlete with concussive like symptoms should not return to activity until properly evaluated and cleared by a physician.
- SRC education is critical for not only league administrators and coaches, but parents/guardians and the athletes themselves.

CONCUSSION STATISTICS

- A 2007 study observing United States High School and Collegiate athletes and concussion revealed:
  - The national estimate of concussions amongst all sports observed (high school and college) was 135,901.
  - Football, Boys' Soccer, Girls' Basketball, Boys' Basketball and Wrestling had a higher rate of concussions caused by contact.
  - Baseball and Softball, had a higher rate of concussions when the athlete was struck by a piece of athletic equipment (i.e. contact with the ball)
  - When observing concussions caused by contact with the playing surface, Boys' and Girls' Basketball, Wrestling and Girls' Soccer had the highest rate.
- A 2012 study observing high school athletic SRC revealed:
  - An estimated 300,000 sports-related concussions occur in the United States annually.
  - Football, Girls' Soccer, Wrestling and Girls' Basketball were the top 4 sports with the highest rate of concussions in the high school setting (based on 20 sports).
  - In high school athletics, there are about 60,000 SRC each year; 63% of those occur in football.
- Some other sports with risk of SRC are:
  - Soccer
  - Basketball
  - Ice hockey
  - Lacrosse
  - Cheerleading
- Studies estimate that approximately 10% of all athletes involved in contact sports have a SRC each season.

SRC Domains

The suspected diagnosis of SRC can include one or more of the following clinical domains:

a. Symptoms: somatic (headache), cognitive (feeling like in a fog) and/or emotional symptoms (lability).
b. Physical signs (loss of consciousness, amnesia, neurological deficit)
c. Balance impairment (gait unsteadiness)
d. Behavioral changes (irritability)
e. Cognitive impairment (slowed reaction times)
f. Sleep/wake disturbance (somnolence, drowsiness)

CONCUSSION RECOGNITION TOOL 5

Recognize and Remove

- Head impacts can be associated with serious and potentially fatal brain injuries. The Concussion Recognition Tool 5 (CRT5) is to be used for the identification of suspected concussion. It is not designed to diagnose concussion.

STEP 1: RED FLAGS – CALL AN AMBULANCE

- Neck pain or tenderness
- Double vision
- Weakness or tingling/burning in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative

Remember In all cases, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed

- Assessment for a spinal cord injury in critical.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not remove a helmet or any other equipment unless trained to do so safely.

If there are no Red Flags, identification of possible concussion should proceed in the following steps:

STEP 2: OBSERVABLE SIGNS

Visual clues that suggest possible concussion include:

- Lying motionless on the playing surface
- Slow to get up after a direct or indirect hit to the head
- Disorientation or confusion, or an inability to respond appropriately to questions
- Blank or vacant look
- Balance, gait difficulties, motor in coordination, stumbling, slow labored movements
- Facial injury after head trauma

STEP 3: SYMPTOMS

- Headache
- "Pressure in head"
- Balance problems
- Nausea or vomiting
- Drowsiness
- Dizziness
- Blurred vision
- Sensitivity to light
- Sensitivity to noise
- Fatigue or low energy
- "Don't feel right"
- More emotional
- More irritable
- Sadness
- Nervous or anxious
- Neck pain
- Difficulty concentrating
- Difficulty remembering
- Feeling slowed down
- Feeling like "in a fog"

STEP 4: MEMORY ASSESSMENT (in athletes older than 12 years)

Failure to answer any of these questions (modified appropriately for each sport) correctly may suggest a concussion:

- "What venue are we at today?"
- "Which half is it now?"
- "Who scored last in this game?"
- "What team did you play last week/game?"
- "Did your team win the last game?"

Athletes with suspected concussion should:

- Not be left alone initially (at least for the first 1-2 hours).
- Not drink alcohol
- Not use recreational/prescription drugs.
- Not be sent home by themselves. They need to be with a responsible adult.
- Not drive a motor vehicle until cleared to do so by a healthcare professional.

Management of Concussions: Conscious Athlete Look For:

- Change of consciousness
- Disorientation or confusion
- Loss or temporary loss of memory
    - If so, how long? Events before the injury AND after the injury?

Monitor:

- Glasgow Coma Scale (GSC)
    - Eye Response
    - Verbal Response
    - Motor Response
- Questions such as
    - What venue are we at today?

- What half is it now?
- Who scored last in this match/game?
- What team did you play last week/last game?
- Did you team win the last match/game?

Ask:

- Immediate recall questions
  - Give 5 words and ask to really remember the words, and have recall them
- Concentration
  - Give a set of numbers (simple-to-complex) and have read going in reverse (i.e. 1, 2, 3 they would say 3, 2, 1)

Any wrong answers should be considered "abnormal" and the athlete should be suspended from playing and referred to a physician for further evaluation.

ALL ATHLETES WHO EXHIBIT CONCUSSION LIKE SYMPTOMS MUST BE CLEARED BY A PHYSICIAN OR QUALIFIED HEALTH CARE PROVIDER TO RETURN TO PLAY.

Advanced On the Field/Sideline Concussion Evaluation

Other on the field tests/assessment tools exists to evaluate concussions. While some of these resources are free, others are associated with a cost/subscription. All tests should only be administered and interpreted by a qualified professional or health- care provider. In some cases, your organization may baseline test athletes prior to athletic participation. Following injury, this baseline data can be used to compare pre- and post-injury data. If an athlete reports any signs and symptoms following a head injury, they should be held out of activity until cleared by a physician. **When in doubt….hold them out.**

Advanced Concussion Evaluations

- Concussion Recognition Tool 5 (CRT5)
- Glasgow Coma Scale (GCS)
- Standardized Assessment of Concussion (SAC)
- Balance Error Scoring System (BESS)
- Sports Concussion Assessment Tool 5 (SCAT 5)
- King-Devick Test (http://kingdevicktest.com)
- Neuro cognitive Testing
  - ImPACT (www.impacttest.com)
  - Axon Sports (www.axonsports.com)
  - Concussion Vital Signs (www.concussionvitalsigns.com)
  - Automated Nneuro psychological Assessment Metrics (http://www.vistalifesciences.com/dev/)
  - Head Minder (http://www.headminder.com)
  - Pencil and paper neuropsychologists based tests

Management of Concussions: Unconscious Athlete

- Activate Emergency Action Plan (EAP).
- Administer and monitor CABs.
- Stabilize neck.
- Treat any other life threatening injuries.
- Treat any unconscious athlete as if he or she has a suspected neck or spinal injury.
- If an athlete loses consciousness at any time, a physician should hold the athlete out of activity until further evaluation, and should only return to activity once they are fully cleared medically.

Treatment following a Concussion Diagnosis

- Currently insufficient evidence that prescribing complete rest achieves these objectives. After a brief period of rest during the acute phase (24–48 hours) after injury, patients can be encouraged to become gradually and progressively more active while staying below their cognitive and physical symptom-exacerbation thresholds (i.e. activity level should not bring on or worsen their symptoms).
- This means athlete/parent must be educated on "cognitive rest" (i.e. school work and video games are a no-no after a concussion until asymptomatic).
- Allowing enough healing and recovery time following a concussion is crucial in preventing further damage.
- Research suggests that the effects of repeated concussions are cumulative.
- Signs and symptoms for an adolescent athlete may take longer to resolve as compared to that of a fully matured adult. A child or adolescent athlete should not begin a controlled return to play progression if they have not returned back to school successfully. Once their controlled return to play progression begins, they should be closely monitored throughout all phases of progression.

Rehab, Refer

- Persistent Symptoms (>10-14 days)
- Multi-disciplinary approach
- Data supports interventions including psychological, cervical and vestibular rehabilitation.
- Closely monitored active rehabilitation programs involving controlled sub-symptom-threshold, submaximal exercise have been shown to be safe and may be of benefit in facilitating recover
- Treatment should be individualized and target-specific medical, physical and psychosocial factors identified on assessment. There is preliminary evidence supporting the use of:
    - An individualized symptom-limited aerobic exercise program in patients with persistent post-concussive symptoms associated with autonomic instability or physical deconditioning, and
    - A targeted physical therapy program in patients with cervical spine or vestibular dysfunction, and
    - A collaborative approach including cognitive behavioral therapy to deal with any persistent mood or behavioral issues.

Following a concussion, there is a period of change in brain function that may last as little as 24 hours to 10 days or possibly indefinitely. During this time, the brain may be vulnerable to more severe or permanent injury. If the athlete sustains a second concussion (known as second impact) during this time period, the risk of permanent brain injury increases.

SECOND IMPACT SYNDROME (SIS)

- Occurs when an athlete who sustained a head injury- often a concussion, sustains a second head injury before the symptoms associated from the first one had resolved.
- This second hit, may be a minor/incidental hit (i.e. congratulatory slap on the back of the head, or two player going to chest jump causing the head to jostle after the bump or on the landing), or may or may not appear to be 'the BIG hit'.
- SIS is associated with a 50% mortality rate (i.e. death) and 100% morbidity rate (i.e. life alternating function).

TIME-OUT!

As of 2013, all 50 states and the District of Columbia has its own laws and guidelines for with regards to concussions, and return to play protocol following concussions. Follow your state and local guidelines regarding concussions.

Return to Play Following Concussion

Athletes should not be allowed to return on the same that day signs and symptoms of a head injury occurred. Following the resolution of symptoms, your physician will have you begin a controlled return to play program prior to fully being cleared to resume activity. It is important that the athlete be honest about how they are feeling prior to exertional progression. If the athlete reports any symptoms, they should follow the guidelines as stated by their physician. This progression back into activity should be supervised by a qualified healthcare professional, or someone identified by your physician. The athlete should be asymptomatic as they proceed from step-to-step.

Table 2 Graduated return-to-school strategy

Stage	Aim	Activity	Goal of each step
1	Daily activities at home that do not give the child symptoms	Typical activities of the child during the day as long as they do not increase symptoms (e.g. reading, texting, screen time). Start with 5–15 min at a time and gradually build up	Gradual return to typical activities
2	School activities	Homework, reading or other cognitive activities outside of the classroom	Increase tolerance to cognitive work
3	Return to school part-time	Gradual introduction of schoolwork. May need to start with a partial school day or with increased breaks during the day	Increase academic activities
4	Return to school full time	Gradually progress school activities until a full day can be tolerated	Return to full academic activities and catch up on missed work

Students should never return to sport before completely returning to the classroom.

Table 1 Graduated return-to-sport (RTS) strategy

Stage	Aim	Activity	Goal of each step
1	Symptom-limited activity	Daily activities that do not provoke symptoms	Gradual reintroduction of work/school activities
2	Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training	Increase heart rate
3	Sport-specific exercise	Running or skating drills. No head impact activities	Add movement
4	Non-contact training drills	Harder training drills, eg, passing drills. May start progressive resistance training	Exercise, coordination and increased thinking
5	Full contact practice	Following medical clearance, participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6		Return to sport	Normal game play

Note: An initial period of 24-48 hours of both relative physical rest and cognitive rest is recommended before beginning RTS progression. There should be at least 24 hours (or longer) for each step of the progression. If any symptoms worsen during exercise, the athlete should be back to the previous step. Resistance training should be added only in the later stages (stage 3 or 4 at the earliest). If symptoms are persistent (more than 10-14 days in adults or more than 1 month in children), the athlete should be referred to a healthcare professional who is an expert in the management of concussion.

Concussion Prevention

- Education…education…education…education (League administrators, coaches, parents/guardians and athletes).
- An emergency action plan addressing recognition, management, treatment and return to play guidelines.
- Athletic equipment (helmets, facemasks, face shields, mouth guards, etc.) cannot eliminate the risk for athletes to have a concussion.
- Use properly fitted and well maintained equipment (head gear, mouth guard, sports specific equipment should be used by athletes).
- Athletes who change their appearance (haircut, weight gain/loss, etc.) should have their equipment rechecked and fitted.
- All athletic equipment should be certified and maintained by an approved safety organization (i.e. NOCSAE, HECC, CSA, ASTM, etc.)
- Athletes should be taught proper techniques (tackling, checking, etc.)
- Referees, league administrators, coaches, parents and athletes should uphold and enforce the rules of the game.
- League administrator should give parents of concussed athletes home care and referral instructions emphasizing the monitoring and management of deterioration sign and symptoms.

Increase Risk Factors for Sports-Related Concussions

- Previous history of concussions
- Number of, severity of, and duration of symptoms
- Gender (data suggests females sustain more concussion than males)
- Age (youth athletes commonly have more prolonged symptoms and recovery, and may more susceptible to concussions)
- Sport, position and style of play
- Mood disorders
- Learning disabilities and attention disorders
- History of migraines

NECK AND SPINAL INJURIES

Injuries to the head, neck and spine can be catastrophic, resulting in both short and long-term problems. Steps to reduce these injuries include not only immediate recognition, but an emergency action plan for appropriately managing these injuries. It is important for all those involved in athletics to practice and rehearse the management of care for catastrophic injuries. A catastrophic cervical spine injury is defined as a 'structural distortion of the cervical spinal column associated with actual or potential damage to the spinal cord. A common cause of neck and spinal injury is the result of: head down contact or "spearing" in which the crown of the head is the initial point of contact.

- Football (American), Gymnastics, Ice Hockey, Track and Field, Lacrosse, Wrestling and Cheerleading reported the highest rate of non-fatal catastrophic cervical spine injuries. (1982-2007)

Signs and Symptoms of Neck and Spinal Injuries:

- Loss of/change of consciousness
- Numbness and/or tingling in the arms and fingers and/or legs and toes
- Significant spine pain with or without palpation
- Obvious deformity of the spine
- Inability to move the arms and fingers and/or legs and toes
- Inability to feel/sense touch
- Possibly breathing difficulties
- Hand grip strength differences (left side vs. right side)
- Foot strength differences (left side vs. right side)
- Decreased range of motion of the cervical spine

Management of Neck and Spinal Injuries for Non-Equipment Based Sports

The primary goal is to ensure the neck and spine are immobilized and that the vitals are satisfactory and accessible in case changes occur.

- Activate the emergency action plan.
- Do not move the athlete.
- One person must maintain cervical spine stabilization. Once you are in position and the spine is held, this person should not be relieved until advanced medical help takes over.
- Communicate and reassure the athlete throughout the entire process.
- Do not attempt to reposition the head/neck.
- Traction must not be applied to the spine.
- Immediately assess the vitals (circulation, airway and breathing).
- Leave the athlete in the position they were found if the vitals are satisfactory.
- If recue breathing becomes necessary, the person with the most training and experience should establish an airway and begin breathing using the safest technique.
- Continue to monitor the vitals until advance medical care arrives.

Management of Neck and Spinal Injuries for Equipment Based Sports

In sports where equipment must be worn for athletic participation, it is critical that league administrators, coaches and onsite medical personal still recognize and manage neck and spine injuries, as it requires delicate and precise management with athletic equipment considerations.

- Regardless of the athletic equipment demands, you must still be able to assess the vitals.
- Facemasks are removable, but require the proper tools, practice and training.
    - Removing the facemasks allows responders to access the airway.
- If the chin-strap is properly fitted (under the facemask and not overtop), it is not necessary to cut the chin-strap when removing the facemask.
- Proper tools, and a secondary backup must be onsite, be fully functioning, and free of defects. These tools can be both electrical and manual tools. The effectiveness and efficiency in removing the face mask with your preferred tools is very important. Each tool has its positives and negatives and should be considered when selecting the most appropriate tool(s).
- Electrical tools
    - Screw drivers
    - Fully charged battery
- Manual tools
    - Screwdrivers (Flat and Philips)
    - FM Extractors
    - Trainer's Angels
    - Pruning Shears
    - Scissors
    - EMT sheers
    - Helmet company specific quick release tool
    - The needle for an air pump
- Helmets and shoulder pads should never be removed from an injured athlete until a neck and spine injury has been ruled out by a physician.
- If either the helmet or the shoulder pads must be removed, they BOTH need to be removed. This skill requires practice and training in a multitude of scenarios.

Neck and Spinal Injury Prevention

- Education…education…education…education
- Teach proper technique
- Enforce rules of the game
- Practice and rehearse neck and spine management (different situations, scenarios, etc.)
- Proper strengthening exercises for the neck for the athletes

TIME-OUT!

Stabilization – Holding head and neck in line to prevent movement.

FACE INJURIES

EYE INJURIES

- More than 2 million people will visit the emergency room for eye injuries each year.
- More than 42,000 sports and recreational eye injuries were reported in 2000.
    - 72% of these injuries were people younger than 25 years of age
    - 43% of these injurers were people younger than 15 years of age
    - 8% of these injuries occurred in children younger than the age of 5

Evaluating the Eye

- Normal and symmetrical appearance
- Pupils equal and reactive to light
- Visual acuity (normal vision, near and far)
- Color acuity (do they perceive normal colors)
- Visual field (is the field of vision normal)

Considerations

- Contacts
- Glasses (prescription eye wear should be polycarbonate lenses or similar)

Foreign Bodies

A foreign body in athletics could be something as simple as a blade of grass or gnat that gets stuck in the eye.

Signs and Symptoms of Eye Injuries

- Red, watery eye
- Possible sensitivity to light
- Burning sensation
- Blurred vision
- Eye pain

Management of Eye Injuries

- Do not rub the eye.
- Remove contact if applicable.
- Wash eye out with water.
- Use corner of gauze pad or cotton swab to carefully touch/dab foreign body if seen.
- Cover eye with a patch if symptoms persist.
- Send athlete to a physician.

EYE ABRASION

An eye abrasion is a scratch on the eye's cornea.

Signs and Symptoms of Eye Abrasions

- Red, watery eye
- Blurred vision
- Possible sensitivity to light
- Eye pain
- Burning sensation

Causes

- Abrasion can be caused by rubbing the eye with foreign object in it.
- Abrasion can be caused by being poked in the eye by another athlete.

Management

- Do not allow athlete to rub eye.
- If eye is sensitive and/or painful, cover with a patch and send to a physician.

Prevention of Eye Related Injuries

- All youth involved in organized sports should be encouraged to wear appropriate eye protection.
- If you wear contact lenses, it is recommended that you also wear eye protection.
- Athletes with only one-functional eye should be required to wear eye protection.
- Face shields in helmeted based sports can help reduce eye injuries.
- Avoid rubbing the eye.
- Eye protection that is damaged or has yellowed with age should be replaced before activity begins.

FACIAL LACERATION

A facial laceration is usually caused by a direct blow. The impact can be caused by getting hit by another athlete or with a piece of equipment.

Signs and Symptoms of Facial Lacerations

- Visible laceration of the skin
- Profuse bleeding
- Pain

Management of Facial Lacerations

- Apply direct pressure
- Cover with sterile bandage
- Refer to physician

Return to Activity

- It is important to leave the stitches or staples in for the intended duration, and to follow all orders regarding return to play and follow-up for removal by the treating physician.
-
- When/If the athlete is able to return to activity, it is important to keep the area clean and covered and monitor for infection. During this time, avoid contact to the area.

This injury needs to be seen by a physician to determine if stitches are needed to reduce scarring. Stitches must be administered within 4-6 hours after injury.

NOSE BLEED AND/OR BROKEN NOSE

- The nose itself is composed mostly of soft tissue and bone (closer to the face).
- There are several causes for nose bleed and broken noses including, sinus infections, coughs and colds, dry noses, medications, foreign body, nose picking and trauma.

Signs and Symptoms of Nose Bleed and/or Broken Nose

- Bleeding from nostrils
- Swelling
- Possible deformity
- Possible difficulty breathing
- Pain

Management of Nose Bleed and/or Broken Nose

- Have athlete sit with chest forward and head straight.
- Pinch upper portion of nose to apply pressure.
- Apply ice to nose area.
- Prohibit nose blowing.
- Pinch the nose for at least 5 minutes and up to 20 minutes.
- Refer to physician if bleeding does not stop.

MOUTH INJURIES

- An estimated 22,000 dental injuries occur each year in people 18-years and younger.
- Dental injuries make up approximately 10-39% of all sports accidents.
- Sports with a higher rate of dental injuries include baseball, basketball, soccer, softball, wrestling, volleyball and gymnastics.
- Children are more susceptible to sports related oral injuries between the ages of 7 and 11 years.
- Baseball has been showing to have the highest incidents of dental injuries between the ages of 7 and 11 years.
- Basketball has been shown to have the highest incident of dental injuries between the ages of 13 and 17 years.
- Mouth Injuries Include
    - Soft tissue inside and outside of the mouth and including the tongue
    - Lacerations, bruising, avulsions
- Jaw
- Dental
    - Fractures, dislocations
- Tooth related
    - Loose tooth, fractured tooth, avulsed tooth
    - The goal is always to try and save the tooth

FRACTURED TOOTH

A fractured tooth can include any chip (small or large) or cracks in the tooth.

Signs and Symptoms of a Chipped Tooth

- Part of tooth is missing or cracked
- Bleeding
- Pain
- Sensitive to heat, cold and pressure
- Possible cut and bleeding from lips

Management of a Chipped Tooth

- Keep the athlete calm
- Check the vitals (circulation, airway, breathing)
- Determine if there are any other life-threating injuries
- Assess the neck
- If no life-threating or neck injuries are present, have the athlete sit with the chest forward and head straight
- Apply pressure (gentle) with a sterile gauze to the area that is bleeding
    - If the chipped tooth is available,
    - Pick it up with a piece of clean gauze. Avoid picking it up by the root, but rather by the crown side
    - Rinse the tooth with clean water (maximum of 10-sec). Do not scrub or scrap the root surface
    - Do not place the tooth in a cup of water
    - Rather place it in a glass of milk or saliva or a commercial product such as a 'Save a Tooth'
- Refer the athlete to the dentists immediately

AVULSION TOOTH

An avulsed tooth can include a tooth that has been partially or completely knocked out of place. Signs and Symptoms of an Avulsion Tooth

- Bleeding
- Tooth dislodged
- Gum swelling
- Pain

Management of Avulsed Tooth

- Keep the athlete calm
- Check the vitals (circulation, airway, breathing)
- Determine if there are any other life-threating injuries
- Assess the neck
- If no life-threating or neck injuries are present, have the athlete sit with the chest forward and head straight
- Apply pressure (gentle) with a sterile gauze to the area that is bleeding
- If the tooth is available,
    - Pick it up with a piece of clean gauze. Avoid picking it up by the root, but rather by the crown side
    - Rinse the tooth with clean water (maximum of 10-sec). Do not scrub or scrap the root surface
    - Do not place the tooth in a cup of water
    - Rather place it in a glass of milk or saliva or a commercial product such as a 'Safe a Tooth'. The athlete may, if they are able (conscious), place it in their mouth
- A wet piece of gauze may be placed in the place of the tooth.
- Refer the athlete to the dentists immediately, as the tooth is difficult to save after an hour.

Prevention of Mouth Injuries

- Have an emergency action plan for recognizing and managing oral/dental related injuries
- Identify a local dentist with extended hours/24-hours care
- Follow all sports rules with regards to athletes wearing of mouth guards
- Mouth guards are most effective if they are appropriately fitted

SUMMARY

Head Injuries

- Both direct and indirect injuries to the head can cause head injuries.
- SRC can occur in all sports (contact and non-contact) and through all levels of athletics (youth, recreational, high school, collegiate and professional).
- When in doubt, hold them out.
- An athlete exhibiting concussion-like symptoms must be removed from play and evaluated by a physician or qualified healthcare professional prior to their return to activity.
- Return to activity should be supervised with a controlled return-to-play progression.

Neck and Spine Injuries

- An unconscious athlete must be treated as if they have a neck or spine injury.
- The primary goal during neck and spine immobilization is to ensure the neck and spine are immobilized, and that the vitals are satisfactory and accessible in case changes occur.
- Facemasks are removable, but require the proper tools and practice and training.
- Always have a primary and secondary set of tools available and in good working order.
- Practicing and rehearsing different scenarios will help with the management of neck and spine related injuries.

Face Injuries

- It is important that eyes are 'normal' and symmetrical, pupils are equal and reactive to light, that visual and color acuity are normal and the field of vision is normal.
- Proper eye protection can prevent eye injuries.
- Any laceration requiring stitches must be administered within 4-6 hours after injury.
- There are several causes for nose bleeds and broken noses including, sinus infections, coughs and colds, dry noses, mediations, foreign body, nose picking and trauma.
- When fitted and worn properly, mouth guards can help prevent dental injuries.
- With dental injuries, an athlete should follow-up with a dentist immediately.

MODULE 7

INJURY PREVENTION, OVERUSE INJURIES AND OVERTRAINING

INTRODUCTION

Injuries are risks associated with sports participation. Being proactive in preventing injuries is the key to success. Simple preventative measures at the league and athletic facility level, incorporating a proper warm-up and cool-down before and after activity and injury prevention programs can help minimize these injuries from occurring. A growing concern among the medical field is the general increased occurrence of sports-related injuries, especially the increase of overuse injuries. As more and more emphasis is placed on specialty training and development for these young athletes and playing the same sport year round, the continued increase of overuse and overtraining injuries likely continue.

Purpose

- Learn how injury prevention changes at the league and facility level, the implementation of warm-up and cool-down sessions, and injury prevention programming can reduce youth-related sports injuries.
- Understand the components of stretching techniques, and where they are best utilized during the warm-up and cool-down.
- Understand the benefits and components of a warm-up and cool-down.
- Learn what causes overuse injuries, how to recognize them, and preventative measures to avoid them.
- Know common overuse injuries (growth-related injuries and repetitive micro-trauma injuries).
- Understand what overtraining means and how to recognize overuse symptoms.

INJURY PREVENTION

The CDC estimates 30-million children participate in sports around the country, with an estimated 2.6 million children seeking emergency room treatment for athletic related injuries. With a staggering number of sports-related injuries seeking medical care, a proactive approach to injury prevention must be taken at the youth and recreational leagues and interscholastic level. Steps to reduce these injuries can involve changes at the League and Athletic Facility Level, the implementation of a proper warm-up and cool-down, and the integration of a preventative injury program.

Injury Prevention: League and Athletic Facility

- Have an emergency action plan and be environmental awareness.
- Regularly rehearse emergency and non emergency situations.
- Require pre-participation examinations/physical yearly for all athletes.
- Inspect facilities for faulty structures (benches, bleachers, etc.) and make the appropriate corrections.
- Inspect facility grounds (fill-in holes and depressions, remove any anthills/mounds/holes, remove bee/wasp nests) and make the appropriate corrections.
- Poles (light, fence, etc.) should be padded and covered.
- Have appropriate medical supplies and equipment (first-aid, AED, etc.)
- Encourage individuals (i.e. league administrators, facility/grounds crew, coaches and volunteers, parents/guardians, etc.) to become certified in first-aid, CPR and the usage of AEDs.
- Encourage individuals (i.e. league administrators, facility/grounds crew, coaches and volunteers, parents/guardians, etc.) to recognize emergency and non-emergency situations and the proper steps to take to manage them (i.e. take the NCSS PREPARE course).
- Document and monitor athletic based injuries.

Injury Prevention: Warm-up and Cool-down

A component of injury prevention includes increasing and maintaining flexibly and integrating a proper warm-up and cool-down prior to, and following activity. While stretching, warming up and cooling down are very important in injury prevention, they are often neglected due to time constraints, inability to incorporate them into activity, or a general lack of knowledge.

STRETCHING: A COMPONENT OF INJURY PREVENTION

Ballistic

- Involves a bouncing, lack of control, uncoordinated movement to force an increase range of motion and flexibility
- Example: bending over and touching their toes (bouncing and touching)
- Not the best option for increasing range of motion
- Results of increase in flexibly are not long term
- Can lead to injury

Dynamic

- Involves a controlled and coordinated pattern of moment (may or may not be sports specific) that integrates current range of motion and flexibility into the demands of athletic performance
- Differs from that of ballistic stretching, as it does not involve bouncy or jerking movements
- Example: long walking strides with an emphasis on body position and breathing
- Can be beneficial in maintaining range of motion and flexibility
- "Wakes the body and muscles up"
- Better neuromuscular response when executed longer in duration (compared to shorter)
- Increases power, and flexibility
- Integrate into a warm-up for the best results
- Athletes report in general, less muscular stiffness

Static

- Usually done with a high force and short duration and not held at the end point of motion

- Involves a long, slow, constant stretch near the muscular endpoint held for 15-30-seconds,and repeated several times (2-4 times)
- There should be no bouncing
- Should not be painful or uncomfortable
- Can inhibit (slowdown) a neuromuscular control (i.e. the rate of contraction and relaxation, positioning, etc.) for upwards of 30-minutes after stretching
- Example: laying on the ground with a rope around your foot, pulling your leg towards yourself
- Better for increasing range of motion and flexibility
- Should not be done prior to strengthening, high speed, explosive or reactivate exercises and activity
- Integrate into a cool-down for the best results

COMPONENTS AND APPLICATION OF THE WARM-UP AND COOL-DOWN

WARM-UP

- Prepares the body for the upcoming event/activity
- Prepares the heart for physical activity (increase heart rate causes an increase in blood flow to muscles)
- Mentally prepares the athletes for the demands of activity
- Should be designed to mimic activities performed during sport(s)
- Beneficial in preventing muscular injury
- Intensity should be progressive (starts low—medium—finish fast)
- Depending on your sport, position, athletic equipment, etc., some athletes may require more or less time warming up
- In hot and humid conditions, you may need to warm-up in a cooler environment indoors before moving out door and/or reduce the time outside. In cooler (wind, temperature, wet conditions), you may need to warm-up inside longer before moving out door and/or increase the time outside
- Encourage and allow athletes to continue to hydrate
- Best if it incorporates:
    - A progressive aerobic activity (i.e. jogging), stretching, balancing exercises, sport specific agility and landing techniques
    - Involves the entire body

Example of a Warm-up: Aerobic Activity

- 5-10 minute duration with a 5 minute recovery
- Start at 40% of your maximum heart rate and progress to 60%
- Examples include: jogging, stationary biking

Dynamic Stretch/Activity

- Should last approximately 10-minutes
- Repeat each stretch/activity 8-12 times

- Replicate the demands of activity
- The athlete should be able to breathe evenly and controlled (non-labored)
- Examples of dynamic stretching include: Side step into a sumo squat, the rib and shoulder flexion/extension
- Examples include: arm swings, power skips for height and/or distance, back peddling

Event Specific Activity

- Time will vary; Each athlete and sport will differ
- Have the athlete perform sports specific task at varying speeds
- As a team, walk through and run through plays (varying speeds)
- Examples include: shooting jump shots, throwing a football, hitting forehand and backhands with a tennis racquet

COOL-DOWN

- Allows the body to cool-down (physically, psychologically, physiologically) and return to a resting state
- Slows down the heart following activity (the heart continues to pump good oxygenated blood to the muscles that are done working)
- Intensity should be progressive (start medium—finish slow)
- Depending on your sport, position, athletic equipment, etc., some athletes may require more or less time to fully cool-down
- Incorporate both activity and static stretching
- Consider the environmental (hot/humid, cold/wet) conditions
- Encourage and allow athletes to continue to hydrate
- Beneficial in preventing muscular injury
- Best if it incorporates:
    - A progressive aerobic activity(i.e. jogging),stretching,
    - Involves the entire body

Example of a Cool-down:

- Aerobic Activity
- Last 5-10 minutes with a 5 minute recovery
- Start at 40%-50% of your maximum heart rate and progress to 20%-30%
- Examples include: Jogging, stationary biking

Static Stretch/Activity

- Should last approximately 5-10-minutes
- Stretching should be held (should not be painful or uncomfortable) for 15-30 seconds, and repeated 2-4 times
- The athlete should be able to breathe evenly and controlled (non-labored). The athlete should focus on relaxing and breathing.
- Examples of static-stretching include: sitting butterfly stretch, cross body shoulder stretch
- Activities include: arms wings, power skips for height and/ or distance, back peddling

Injury Prevention: Injury Prevention Programs

Certain specific physical demands placed on the body during sports participation can make certain sports injuries more common as compared to that of other sports. As shoulder and elbow injuries are more common in baseball and softball players, and knee injuries are more common in basketball and soccer, the intervention of injury preventative programs may be warranted.

What can seem like an over whelming task, partnering and working with a local sports-trained physician, physical therapy group or athletic trainer can be helpful in creating and implementing a sports-specific injury prevention program. While injury prevention is key in preventing injuries in athletes who are not experiencing current problems, it is also critical in athletes coming off of injury to progress slowly back in to activity, following strict guidelines for progression as to prevent re occurring injury.

As an athletic league you can also:

- Enforce national sports rules regarding counts (i.e. pitch counts, hit counts, etc.)
- Identify those athletes who play in multiple leagues/teams simultaneously, and take preventative measures to prevent overuse injuries

While your local healthcare provider may have its own injury prevention program for sports-related injuries, other examples of injury prevention programs include:

Shoulder

ASMI Throwers-10
USA Tennis; Tennis Technique and Injury Prevention Program

Knee

FIFA 11+
Santa Monica ACLPEP

OVERUSE INJURIES AND OVER TRAINING

What are Overuse Injuries?

The body normally adapts to the stresses and demands of athletic activity. When the stresses and demands of athletic activity exceed that of the body's normal adaption processes, a higher rate of tissue breakdown is likely to occur, leading to negative physiological changes and an increased risk for developing injuries. As youth and adolescents are in the process developing and growing, athletic activity stresses and demands can easily overwhelm the body's ability to adapt, causing structural changes in the body and eventually, overuse injuries. Two types of overuse injuries include growth-related injuries, and repetitive micro-trauma related injuries.

Types of overuse Injuries / Growth-Related Injuries

- Osgood-Schlatter Disease (effects the knee)
- Severs Disease (effects the heel)
- Little Leaguer's Elbow (effects the elbow)

Repetitive Micro-trauma Injuries

- Stress Reactions/Fractures (most common in the foot, shin and spine)
- Tennis elbow (effects the forearm/elbow)
- Swimmers shoulder (effects the shoulder)
- Jumpers knee (effects the knee)
- Runners knee (effects the knee)

General Signs and Symptoms of Overuse Injuries (Can differ, injury to injury)

- Pain (may be local or generalized)
- Swelling
- Change in technique (throwing, jumping, running, swimming, etc.)
- Decrease interest in activity

Overuse Injury Levels of Severity

Thinking it's just soreness, it is not uncommon for these athletes to report the injury well after they have already experienced symptoms. Athletes should be encouraged to report how they are feeling daily, making modification if necessary and to practice prevention in order to reduce overuse injury severity.

Injury Severity	Symptoms and Characteristics
Level 1	Symptoms occur at the end of, or following activity. It may only bother the mat the initiation of activity, then diminish after they are 'warm'.
Level 2	Symptoms develop during or late into activity, then diminish after activity has completed.
Level 3	Symptoms develop during activity (early onset and persistent during the remainder of activity). Symptoms diminish after activity ends.
Level 4	Symptoms develop during activity and limit participation (training, conditioning, activity, etc.), including an increase in frequency, intensity and duration of signs and symptoms.
Level 5	Symptoms prevent participation (training, conditioning, activity, etc.).

RISK FACTORS FOR OVERUSE INJURIES

Intrinsic Risk Factors

- History of prior injury/repetitive injury
- In adequate conditioning and/or preparation for athletic activity
- Anatomical mal alignment
- Muscle Imbalances
- Increase laxity
- Inflexibility
- Muscle Weakness
- Instability
- Height (tall)
- Weight (heavier)
- Menstrual dysfunction
- Psychological factors
- Age (young)
- Experience

Extrinsic Risk Factors

- Training Errors (in appropriate training progression and/or in adequate recovery)
- Equipment problems (not maintained, fitted correctly, used correctly)
- Environment
- Poor technique
- Coaches, parents and peers unaware of or ignoring factors
- Sports-acquired deficiencies
- Conditioning

Preventing Overuse Injuries

- Have athletes undergo a yearly physical, in the history section, have questions geared towards overuse injuries, and during the physical examination look for intrinsic risk factors.
- Limit extrinsic risk factors
- Observe and practice alterations in sports to improves a fety and reduce injury
    - Pitch counts in throwing sports
    - Reduce the volume of contact during contact sports
    - Observe and practice, and if necessary limit vigorous activity
    - Ifanathleteplaysformorethanoneteam,beobservantof'their'pitchcount
- Delay sports specialization and encourage athletes to play different sports
- Encourage athletes to take time off between seasons
- Encourage athletes to let them know how they are feeling

What is Overtraining?

Over training is a condition in which prolonged fatigue and under performance occurs following periods of heavy training/conditioning or competition. Similar to other conditions (burnout, staleness, chronic fatigue syndrome) brought on by heavy training / conditioning and competition causing a decrease in performance and increase of fatigue, overtraining is marked by signs and symptoms lasting at least 2weeks, if not months.

Factors Related to Overtraining

- The length of the competitive season
- Monotony training
- Feeling claustrophobic
- Lack of positive reinforcement
- Feeling helplessness
- Abusiveness from authorities
- Stringent rules
- High levels of competitive stress

Signs and Symptoms

- Decreased sports performance
- Sleep disturbance (difficulty sleeping, sleeping without feeling refreshed, etc.)
- Fatigue
- Chronic muscle and joint pain
- Weight loss, and loss of appetite
- Increased heart rate at rest
- Lack of enthusiasm
- Frequent illness, frequent minor infections(particularly cough and colds)
- Difficulty completing the usual routine(school, home, chores, athletic events/training)
- Decrease in school performance
- Excessive sweating
- Elevated body temperature
- Loss of confidence
- Anxiety
- Depression
- Personality or mood changes
- Increased irritability
- Confusion

Treating Overtraining

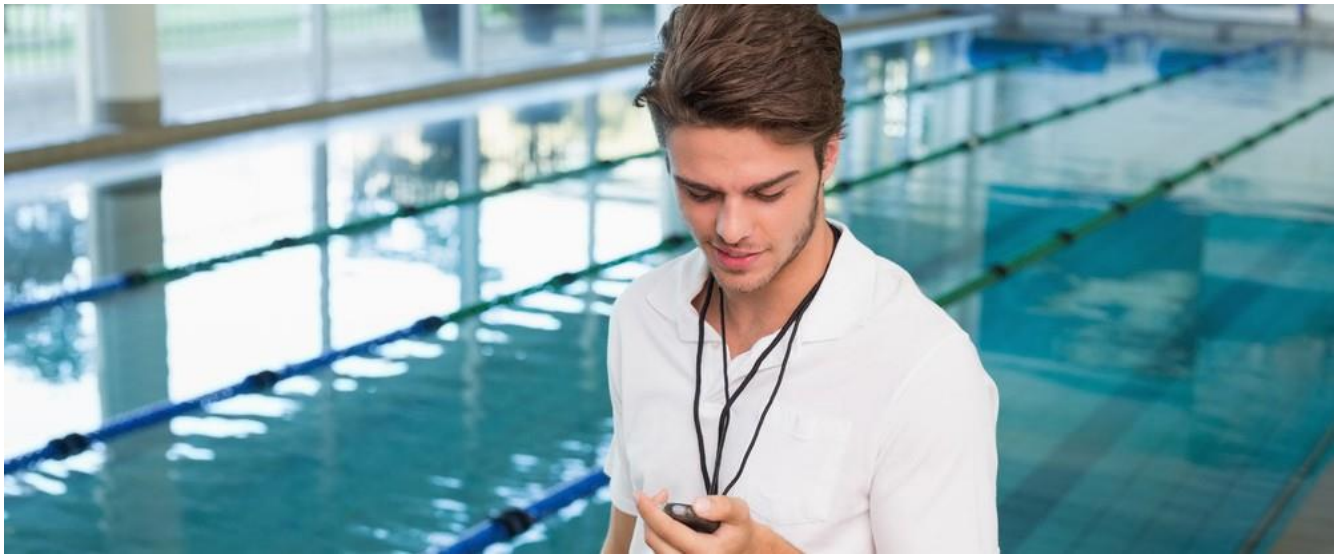
- Referral to a physician for evaluation and treatment. Treatments commonly include rest and time away from training and activity (no timetable).

Prevention of Overuse Training

- Keep sports and activity fun
- Proper training/conditioning progression (proper per iodization)
- Good Life-Work balance
- Maintain good nutrition habits and levels
- Maintain good hydration habits and levels
- Maintain good sleeping habits(at least 8-hours a night)
- Communicate with parents about the athlete's involvement in simultaneous sports play (playing on multiple teams during one season), and how the athlete is feeling
- Avoidanceofstimulants(i.e.caffeine,coffee,energydrinks,etc.),,tobaccoandalcohol
- Encourage your athletes to take time off between seasons

SUMMARY

- Steps for injury prevention can include changes at the league and athletic facility level, with the implementation of a proper warm-up and cool-down and with the integration of an injury prevention program.
- Dynamic stretching and activity should be incorporated in a warm-up.
- Static-stretching should be performed following activity, not before.
- A proper warm-up should include some progressive aerobic activity, dynamic stretching and activity followed by sports specific skills
- A proper cool-down should include some light regressive aerobic activity followed by static stretching.
- There are 5 levels of severity when it comes to overuse injuries.
- Over training is brought on by heavy period soft raining/conditioning or competition and is associated with prolonged fatigue and under performance.



MODULE 8

INJURY TERMINOLOGY, NUTRITION, AND HEALTH OTHER RELATED CONCERNS & CONSIDERATIONS

INTRODUCTION

In this module you will learn about some common athletic injuries as well as about nutrition and recommended health habits of athletes.

Purpose

- Recognize the basic terminology and injuries that are associated with sports.
- Identify proper nutrition and nutritional supplements.
- Learn about the effects of steroids.
- Understand heart-related issues.
- Learn how to handle pregnancy in sports.

INJURY TERMINOLOGY (WORDS ARE LISTED ALPHABETICALLY)

GENERAL SPORTS MEDICINE TERMINOLOGY	
Abrasion	A scraping wound to the skin. Examples include a turf burn or raspberry.
Acute Injury	An injury occurring suddenly. Examples include an ankle sprain, or ACL
Avulsion	Tear. The tearing of a structure. Common with the skin and on bone.
Blister	An injury to the skin caused by friction, resulting in a fluid-filled sac. These should not be popped, unless by a medical professional, as there is an increased risk for infection.
Bursitis	Inflammation of a bursa. A bursa is a fluid-filled sac that helps in providing liberation and decreasing friction between tendons, bones and joints.
CAB	An acronym for Circulation, Airway, Breathing. When assessing a situation, evaluate for CAB.
Chronic Injury	Aninjuryoccurringovertimeorduetorepetitivetrauma/force.Examplesincludestress fractures or tennis elbow.
Concussion	An injury to the brain caused by a direct and/or indirect blow causing complex changes in the brain (brain, nerves, blood flow, etc.). These changes can effect motor-control, neurological, (neuro) cognitive, (neuro) psychological and physical movement. Signs and symptoms may present immediately following an injury, or hours following. If a head injury (director indirect) was observed or reported, the athlete should be evaluated and held out and monitored for any changes in signs or symptoms, and not permitted tore turn to activity until cleared by a physician or qualified healthcare professional.
Contusion	A bruising-like injury causing bleeding, swelling and discoloration in the surrounding soft tissue.
Dislocation	A condition where the bones are no longer in their normal alignment and do not realign on their own.
Dehydration	A low level of water in the body. Dehydration can make one at risk for developing other heat-related illnesses. Signs and symptoms of dehydration can include: thirst, flushed skin, fatigue, muscle cramps, lack of interest/enthusiasm or lethargic, dry lips and mouth, darker colored urine (dark yellow, apple juice, etc.), feeling week or dizzy, light headedness.
Fever	Is a temporary increase in body temperature, often due to an illness
Fracture	The breaking of a bone. A fracture and broken bone have the same meaning. There are different types of fractures, or broken bones, depending on the type of break and its locations in the body.
Hematoma	A localized swelling that is filled with blood caused by a break in the wall of a blood vessel.
Joint	The junction between two bones. Joints are normally supported by ligaments, and are moved by muscles. Examples include the shoulder, knee and ankle.
Laceration	As of t tissue wound caused by a force (i.e. blunt object) or sharp object.
Muscle	Soft tissue in the body that carries nerve/electrical impulses around the body. Nerve scan signal muscles to contract, reaction, as well as other normal body functions.
Nerve	Soft tissue in the body that carries nerve/electrical impulses around the body. Nerves can signal muscles to contract, reaction, as well as other normal body functions.
Puncture	A soft tissue wound involving an object stabbing through the soft tissue. If the object remains embedded, it is termed an embedded foreign object.
Skin Infection	Is an infection to the skin. Can be bacterial, fungal or viral. Similar to other types of infection, they can be transmitted through direct contact (skin-to-skin contact) and indirect contact (sneezing or coughing on something/someone). Special attention should be brought to preventative measures, in order to reduce the occurrence of skin infections.
Sprain	An injury to a ligament involving stretching or tearing of the fibers. There are 3 classifications of sprains. Type 1/mild, Type 2/moderate, Type3/severe.
Stress Fracture	An over use injury of the body, whereby the stresses and demands of activity exceed the bones ability to repair and respond to the stresses, causing a breakdown of the bone.
Tendon	The soft tissue at either end of a muscle, attaching the muscle to bone or other soft tissue. Tendons can be damaged if the muscle is strained.
Tendinitis	Inflammation of at end on.

INJURY TERMINOLOGY: LOWER BODY

AC Sprain	Sprain of the ligaments that hold the clavicle to scapula.
Brachial Plexus	"Stinger" a temporary condition affecting the strength and range of motion of a body part.
Boxers Fracture	It is a fracture of a bone in the hand. It commonly occurs when someone, with fists, punches a wall.
Clavicle Fracture	Also known as a "broken collar bone", it is usually caused by a direct blow or falling on the shoulder.
Colles Fracture	It is a fracture of a bone in the (forearm) wrist. It commonly occurs when someone falls on the out stretched hand/arm. It is sometimes referred to as a "silver fork" deformity.
Game keepers Thumb	It is an injury to the ligament in the base of the thumb. It commonly occurs when the thumb is forced into extension. It is sometimes referred to as "skiers thumb". It is not uncommon
Golfers Elbow	An overuse injury. Occurs when the muscles of the inside (inner) portion of the elbow/ forearm become inflamed due to repetitive stress. It is similar to that of tennis elbow.
Impingement Syndrome	An overuse injury. Occurs when one of the rotator cuff muscles becomes inflamed by repetitive friction by the bony structure (AC Joint) of the shoulder. It can be common in athletes who are involved in overhead motions such as throwing or blocking/serving in volleyball.
Jersey Finger	It is at ear in the tendon of the finger that causes your finger to curl (flex) towards the palm. It is prevalent in sports where grabbing an object or opponents jersey is common.
Little Leaguer's Elbow	An overuse injury. An injury to the growth plate in the elbow, it commonly occurs by repetitive throwing motion (repetition, intensity).
Little Leaguer's Shoulder	An overuse injury. An injury to the growth plate in the arm/shoulder. It commonly occurs by repetitive over head motion (repetition/intensity).Throwing based athletes, gymnasts and tennis players can be prone for this injury.
Labral Tear	An injury to the shoulder. It can occur acutely or through repetitive overuse. Acutely, it can occur due to falling on the out stretched arm, a direct blow to the shoulder or when a suddenpullingorliftingmotionoftheshoulder.Repetitivemotionofoverheadandweigh lifting athletes are more prone for overuse injury.
Swimmers' Shoulder	An overuse injury to the shoulder. It is similar to that of Impingement Syndrome, and the structures of the shoulder being inflamed.
Shoulder Dislocation/Subluxation	Occurs when the arm bone (humerus) comes off of the shoulder joint completely (dislocation) or partially (subluxation). A shoulder dislocation and subluxation most commonly occurs acutely, and is caused by falling on the out stretched hand, falling and landing on the shoulder, blunt trauma to the shoulder or by holding a heavier weight (weight, person, etc.).A person with a history of a dislocation or subluxation may have
Subungal Hematoma	An acute injury to the mail of a finger commonly caused by an object being dropped or by being hit in the nail/finger. Blood fills in the soft tissue below the nail.
Rotator Cuff Strain	A strain of one of the 4 muscles that comprise the rotator cuff. The rotator cuff provides stability and strength for the shoulder.
Tennis Elbow	An overuse injury. Occurs when the muscles of the outside (outer) portion of the elbow/ forearm become inflamed due to repetitive stress. It is similar to that of Golfers Elbow.
Ulnar Collateral Ligament (UCL)Sprain	A sprain of the ligament on the inside of the elbow. It's common in throwing athletes (baseball, softball, QBin football, etc.) Reconstruction of this ligament is commonly known as "Tommy John" surgery.

INJURY TERMINOLOGY: LOWER BODY

Anterior Cruciate Ligament (ACL) Sprain	One of the main stabilizing ligaments of the knee. The ACL prevents the tibia (The shin bone) from moving too far forward on the femur (thighbone) and providing rotational stability of the knee. Sprain can occur by contact.
Compartment Syndrome (Acute)	Affecting the shin, compartment syndrome brought on by an acute injury (kick to the shin, something striking the shin with a higher/blunt force), increase pressure to the blood and nervous tissues causing pain, numbness and tingling in the lower leg and foot. It is not uncommon for the athlete to report not being able to lift the foot and/or toe. **THIS INJURY IS A MEDICAL EMERGENCY**
Compartment Syndrome(Exercises Induced)	Affecting the shin, compartment syndrome brought on by exercises, occurs when an increase in pressure of the shin constricts blood flow to the lower leg and foot. It is not uncommon for athletes to complain of numbness or tingling as exercise continues. Usually at rest, all symptoms reside. You should avoid placing a compression wrap around the area.
Eversion Ankle Sprain	An acute injury involving the stabilizing ligaments on the inside of the ankle. Occurs when the foot moves outwards. It is common to report pain around the outside part of the ankle and pain moving the ankle. In more severe cases, athletes may report an unstable or loose feeling.
Groin Strain	A strain to the muscles that brings the leg inward (adduction of the hip/leg)
Hip Flex or Strain	A strain to the muscles that brings the leg forward (flexion of the hip/leg)
Hip Pointer	A contusion (bruise) of the iliac crest of the hip. This is usually caused by a direct blow or falling on this area. It is very painful as numerous muscles attach in this area.
Illiotibal Band Syndrome (IT Band Syndrome)	Can occur acutely (direct trauma) or by overuse (muscle compensation, muscle weakness, etc.) Pain is usually along the outside of the thigh, but can extend down to the knee, and occurs during sporting or general (walking up and down stairs) activity.
Inversion Ankle Sprain	An acute injury involving the stabilizing ligaments on the outside of the ankle. It is common to report pain around the outside part of the ankle and pain moving the ankle. In more severe cases, athletes may report an unstable or loose feeling.
Jones Fracture	It is a fracture of a bone in the foot (outside part of the foot - where the bone jets out). It commonly occurs when the foot moves inwards (inversions) and downward (plantar flexion). It is not uncommon during severe inversion ankle sprains, to fracture or avulse part of the bone as well. Pain, swelling and bruising is not uncommon following injury.

Lateral Collateral Ligament(LCL) Sprain	A sprain of the ligament on the outside of the knee. The LCL prevents the tibia (the shin bone) from moving outwards from the femur (thigh bone). Usually caused by a direct blow on the inside part of the knee.
Medical Collateral Ligament(MCL) Sprain	A sprain of the ligament on the outside of the knee. The MCL prevents the tibia (the shin bone) from moving too inward from the femur (thigh bone). Usually caused by a direct blow on the outside part of the knee.
Meniscus Tear	Also known as a "cartilage" tear. The Menisci (there are 2), act as cushions between the bones of the knee.
Osgood-Schlatter Disease	An overuse injury affecting the knee (shin bone). Repetitive stress, a quadriceps becoming bigger and stronger, pulls on the insertion point in the shin bone, causing it to pull away as it is developing. Inflammation (apophysitis) develops in the area of the growth plate causing an increase in pain, and decrease of function (running, jumping, kneeling, etc.)
Patella Dislocation/Subluxation	An injury to the patella (kneecap). A patella dislocation and subluxation most commonly occur acutely and is caused by a force on the inside portion of the patella, a forceful contraction of quadriceps, or twisting motion of the knee). A person with a history of dislocation or subluxations may have repetitive episodes.
Patello femoral Pain Syndrome(PFPS)	An overuse injury, associated with pain in the front of the knee (patella, patella tendon, etc). Athletes may report pain around the front of the knee that feels worse during activity (walking up and down stairs, jogging, running, cutting, jumping, etc. While it can occur in all types of athletes, it is commonly known as Runner's Knee.
Plantar Fasciltis	An overuse injury, associated with pain on the bottom part (the arch) of the foot. It can be more common in people with no arch (flatfooted) high arches and wearing shoes with little to no support. Pain is usually reported under the heel, but can extend to the middle (of the bottom) of the foot. Activities such as running, jumping and agility work can be very painful.
Shin Splints	An overuse injury causing irritation to the muscles, tendons and bones of the lower leg. Several risk factors for developing shin splints include muscle weakness (compensation of the lower leg), weak hip musculature, and foot related concerns (high arch, low arch, poor show support). Training errors can include training/conditioning/participating on hard surfaces (i.e. concrete, asphalt wooden and rubberized gym floors. Concern for stress fractures must be ruled out by a physician.
Syndesmotic Ankle Sprain	Also known as a "high-ankle sprain", it is a sprain of the ligaments in the middle/top middle of the ankle. Commonly occurs with a forced downward motion (planter-flexion) coupled with a rotational force or during a severe version ankle sprain.
Thigh Contusion	An acute injury to the thigh commonly associated with a compression/force caused by something (i.e. getting kneed, a bat or ball striking the thigh, etc.) Pain, swelling, tenderness and discoloration are common.
Turf Toe	An acute and over use injury, turf toe is initially caused by forced extension (acute) or by repetitive training on a harder surface (concrete, asphalt, etc.) (overuse). It is painful to walk/push off the toe.

NUTRITION, HYDRATION, SUPPLEMENTATION, AND PERFORMANCE ENHANCING DRUGS

Nutrition and Hydration

As compared to the collegiate and professional athlete, it may be more difficult for youth/recreational and high school athletes to eat properly (busy schedules, poor access to nutritious foods quality, skipping meals, and peer pressure). As collegiate and professional athletes have more resources including professional nutrition personnel, and training tables (convenient dining facility), regardless of the level of athletics you participate in (youth/recreational through professional) it is important to maintain the proper elements of nutrition and hydration while training and participating in athletics. The importance of, and information regarding hydration was discussed in module 2 (Environmental Concerns), and should be referred to and reviewed. It is import- ant for athletes of all levels to incorporate a variety of different carbohydrates, proteins and fats into their regular diet.

Nutrition Facts

- An athlete wanting to achieve top performance should include 55% of calories from carbohydrates, 15% from proteins, and 30% from fat.
- To enhance muscle size, the athlete must be on a challenging strength program and ingest an additional 500 calories per day from all sources such as carbohydrates, proteins, and fats.
- Athletes who eat a balanced diet should receive the required amount of vitamins needed for performance.

Carbohydrates

- Variety is important in a balanced diet.
- Eat a variety of food types that are high in carbohydrates and low in fat.
- Athlete must eat adequate carbohydrates in order to maintain energy, strength and stamina.
- Types of carbohydrates:
    - Pasta
    - Fruits
    - Vegetables
    - Potatoes
    - Whole grain cereals

Proteins

- Athletes should also choose foods that are high in protein.
- Proteins are not a primary source of energy fuel, they are the main component of the muscles and organs.
- Examples of high quality protein:
    - Chicken
    - Turkey
    - Soybeans
    - Milk

- Eggs
- Beans
- Nuts

Fats

- Fats are important for the building and maintaining of cells.
- Fats are considered the secondary source of energy.
- They help protect the athlete's body and internal organs.
- Examples of good fats:
  - Fish (cold water)
  - Oil (olive, sunflower, peanut)
  - Soft cheese
  - Avocado
  - Nuts and seeds

Gaining and Losing Weight

- Athletes that are trying to gain weight should follow these guidelines:
  - Never skip meals.
  - Choose foods with a high nutrient content.
  - Choose healthy snacks between meals.
  - Consume more calories than burned.
- Athletes that are trying to lose weight should consider the following:
  - No diet supplements or fad diets should be used.
  - No snacking between meals.
  - Decrease caloric intake.
  - Continue to exercise moderately and not excessively.

Working with a registered dietician and/or nutritionist can be helpful for those athletes wanting to properly gain or lose weight.

Nutritional Supplements and Performance Enhancing Drugs

Some athletes wanting to participate at the highest level possible will take the competitive steps to seek an advantage over their peers. Some of these competitive advantages include taking supplements and performance enhancing drugs.

Supplementation

- A supplement is a wide spectrum of products including fortified whole foods, herbal products and ergogenic aids and products designed to improve work or performance.
- A dietary supplement is a product (other than tobacco) that is intended to supplement the diet that contains one or more of the following dietary ingredients: vitamins, minerals, herbs or other botanical; amino acids; dietary substance to supplement the diet by increase the total dietary intake.
- Athletes should be encouraged to take food-first philosophy (actual food vs supplemented alternatives).
- Athletes should understand that dietary supplements do not require third-party verification (purity, quality, safety, efficacy, etc.)
- Education for coaches, parents and athlete is critical in the area of supplementation and performance enhancing drugs.
- Coaches, parents and athlete should be aware of the lack of regulation of this industry, and that the athlete is ultimately responsible for what they put into their bodies.

Supplementation Statistics

In 2012, The Journal of Pediatrics reported nearly 6% of urban middle school and high school boys surveyed admitted to using appearance and performance enhancing drugs without a physician's prescription, while 4.6% of urbam middle school and high school girls surveyed admitted to using steroids. In this study, 35% of the students (boys and girls) responded as using protein supplementation while 11% responded as using muscle-enhancing supplements.

Caffeine

- Is used as a stimulant
- Can be found in coffee, teas, and energy drinks, as well as found in dietary supplements and performance enhancing drugs
- Can be purchased as your local grocery or convenience store or online
- In 2011, there were 1,499 energy drink-related emergency department visits by 12-17 years olds
- Can lead to dehydration and other heat related illnesses
- Can lead to heart related concerns

Creatine

- A nutritional supplement that is continuing to increase in popularity.
- Claims that it increases strength, muscle power, and stamina.
- Can lead to cramping and dehydration.
- There are no definitive answers to the long term effects it can have on the athlete's body and long term risks associated with creatine.
- Any individuals that are considering taking creatine should consult a sports medicine professional prior to making the decision.

Protein

- Widely used, and associated with the repair of muscles
- Protein can be acquired through whole foods (see Protein section above) or through supplementation (shakes, bars, paste, etc.)
- Common protein supplementation includes whey and casein

Performance Enhancing Drugs

As it relates to athletics, performance enhancing drugs have gained a lot of attention in the last 10 years. While numerous performance enhancing drugs and products are available, numerous negative side effects can effect an athlete for a lifetime.

- 85% of high school athletes have never had a parent, coach or teach talk with them about the dangers of performance enhancing drugs.
- Over 1.5 million teens have admitted to using anabolic steroids
    - Average age of 1st time users: 15
- 40% of high school seniors say steroids are easy to obtain
- 5-6% of high school and middle school athletes have used anabolic steroids
- 57% of steroid users said that they would use steroids if it guaranteed them reaching their athletic goals, even if it shortened their life.
- Steroids can be found quickly and easily for sale on the internet.

Ephedrine

- This substance has been banned from most sports organizations.
- It has become illegal in the United States due to the number of deaths directly related to its use.
- Used as a weight loss supplement
- Other products that include appetite suppressant and stimulant qualities may be similar to that of ephedrine.

Androstendion (Andro)

- Potentially dangerous nutritional supplement.
- It gained its greatest level of interest when it was announced that Mark McGuire was taking this during his home run record breaking season.
- It has been associated with heart and liver disease.
- It has been known to cause males to develop female characteristics.

Anabolic Steroids

While there is a lot of information regarding the dangers of using anabolic steroids, there continues to be a rise in the percentage of high school athletes using them to achieve the "extra edge." Continual education, testing and monitoring your athletes is the only way to ensure that they are not becoming involved with steroids.

- Changes in someone using steroids may include physical and personality/social changes.

    - **Physical Changes**
    - Unusually fast muscle growth
    - Unusually oily or greasy hair
    - Acne (common on the shoulders and back)
    - Thinning hair (hair loss)
    - Shrinking testicles (men)
    - Enlarged breasts (men)
    - Decrease in breast size (women)
    - Deepen voice (women)

- Yellowish colored skin
- Increase in infection(s)

- **Personality and Social Changes**
- Mood swings
- Increased aggression
  Disrespectful or abusive (verbal and/or physical)
- Become more secretive
- Withdraws from friends and family
- Paranoia
- Depression
- Always wanting to workout
- Sleeping more often/takes naps
- Forget plans and activities

Several known effects from the use of anabolic steroids include:

- Liver Damage
  - Liver tissue damage and even liver bleeding
- Risk of Heart Disease
  - High blood pressure
- Sexual and Reproductive Disorders
  - Males can develop female characteristics and females can develop male characteristics.
- Psychological Disorders
  - Increased aggressive behavior and mood elevation
- Effects on Growth
  - Bones will close or mature earlier than usual

The side effects of anabolic steroid use have been researched and are well documented. However, the long term effects of their use are yet to be determined. It is not known what types of detrimental side effects today's users will be facing 25-30 years from now.

OTHER HEALTH-RELATED ISSUES

HEART

Anatomy

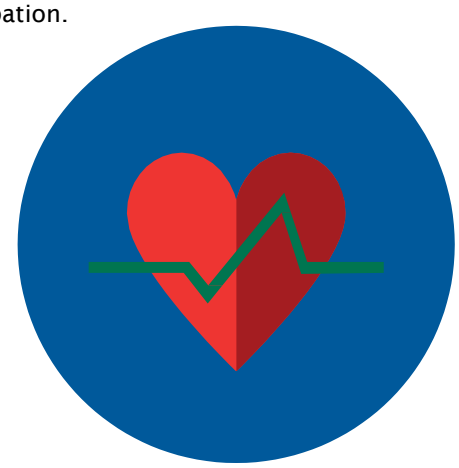
- The heart is the main pumping mechanism.
- It circulates oxygenated blood throughout the body to the working tissues.
- The adult heart lies under the sternum, slightly to the left, between the lungs and in front of the vertebral column.
- The heart is about the size of a clenched fist.
- The heart muscle consists of 4 chambers:
  - Right Atria - Left Atria Right Ventricle - Left Ventricle

Know Your Athlete

- Pre-participation screenings
  - The most vital part of all sports programs
- History
  - Any family history of heart disease
  - Murmurs
  - Family member that passed away before the age of 50
  - Prior surgeries
- WPW (Wolff Parkinson White)
- Heart transplant
- A normal cardiac cycle includes two sounds. Often referred as “lubb-dupp.”
- An abnormal sound is called a murmur.
- A murmur occurs because of some defect in one of the valves/chambers within the heart.
- Many murmurs will be heard in babies, but does not affect them when they are older.
- It is important to note if an athlete has a murmur.
- A murmur DOES NOT NECESSARILY disqualify them from play (Some murmurs can be associated with conditions that can be life-threatening to athletes. i.e. Hypertrophic Obstructive Cardiomyopathy = HOCM)
- Further workup may be needed for clearance, but it is just to further investigate what the physician heard and to make sure the athlete is safe for participation.

Signs & Symptoms of a Heart Condition

- Chest tightening
- Pressure in the chest
- “Gas bubble” feeling
- Pain radiating into left arm/left side
- Shortness of breath
- May be gasping
- Dizziness
- Athlete may collapse for no apparent reason



Sudden Cardiac Arrest (SCA) and Sudden Cardiac Death (SCD)

- Leading causes of death amongst young athletes
- Can be the result of congenital abnormally thickening of the muscular walls of the heart or through or through the chest being struck with blunt object, as with cases of Commotio Cordis.
    - Often, the underlying causes of sudden cardiac death is a structural cardiac abnormality. However, as many as 80% of these patients are asymptomatic until sudden cardiac arrest occurs.
    - Sudden cardiac death in young athletes caused by trauma is commonly associated with a blunt trauma to the chest/ heart region (22%), such as in cases of Commotio Cordis (3%).
- Sudden Cardiac Death (SCA) leading cause of death in the United States, effecting approximately 300,000 people each year. Remember, this includes the young and old; the athlete, the coach, the league administrator, the grounds crew/facility workers, the parent and the spectators.
- The American Heart Association estimates approximately 95 % of all persons suffering from sudden cardiac arrest will die before reaching the hospital.
- Sudden Cardiac Death is the leading cause of death in the NCAA:
    - - 45 SCD/273 all deaths (2004-2008)
- Sudden Cardiac Death is the leading cause of death amongst athletes:
    - 13 Heart Related Deaths/33 Deaths (2013)
    - 25 Heart Related Deaths/34 Deaths (2012)

Commotio Cordis

- Is the sudden death of an individual as a result of seemingly innocent chest wall impact that occurs in the absence of any significant thoracic or cardiac trauma.
- Factors for Commotio Cordis:
    - Small, dense object
    - The timing of the impact
    - Impact directly over the heart
- Most commonly occurs in athletes between the ages of 8 and 18.
- Occurs most frequently in as baseball, softball, ice hockey, football, soccer, cricket and lacrosse.
- From 1996 to 2007, 188 cases of commotio cordis have been recorded:
    - 48% occurred during organized sports
    - 39% occurred despite wearing chest protecting equipment
- With a high incident of death following trauma, survivability has been reported in only 28% of cases. Of survivability cases, proper recognition with resuscitation was given within three-minutes of incident, and when available, defibrillation was administered early by an automated external defibrillator (AED).
- Following a hit to the chest (person, blunt object, etc.), the person may collapse immediately or staggers momentarily then collapse to the ground. Signs and symptoms of commotion cordis include unconsciousness, no breathing, no pulse.

The Importance of an AED

- While the initial cost of an AED and supplies is costly, they can save lives. And that has no cost.
- An AED should be applied to an individual within 3-5 minutes after the athlete needs it (collapse/drop-to-shock is 3-5 minutes). Every minute after 3 minutes is associated with a 7%-10% decrease in life.
- An AED and appropriate supplies should be regularly checked and maintained.
- Your emergency action plan should have the location(s) for all AED's.
- When rehearsing scenarios, include situations that may require the use of an AED.
- League administrators and coaches should be able to recognize the signs and symptoms associated with SCA, and be able to administer appropriate treatment.

Preventing SCA/SCD

- Have an emergency action plan.
- Educate all those involved in athletics (League administrators, coaches, athletes and parents) about the warning signs and required immediate treatment for SCA/SCD.
- Encourage all those involved in athletics to become trained in CPR and the use of an AED.
- While chest protecting equipment can't fully eliminate injury, they can be helpful in reducing the occurrence, and should be used/worn correctly during all practices and games.
- Ensure that all equipment is properly fitted and meets all standards by its governing body (NOCSAE, ASTM, HECC, and PECC).
- Teach athletes who to protect themselves, and avoid getting hit. Do not step into the shot or block it with your chest.
- If softer baseball, softballs, lacrosse balls and pucks are available, utilize them during youth play.
- Maintain all playing surfaces.

THE FEMALE TRIAD

What is the Female Athlete Triad?

During periods of intense, prolonged training or exercise, and decreases in caloric (food) intake, parents, coaches and athletes should be aware for the potential increased risk of injury. In particular, those female athletes who are training at higher intensities (time, duration, etc.) and limit their caloric intake and exhibit symptoms such as amenorrhea, excessive weight loss, and have a family history of osteoporosis should be concerned about the female athlete triad.

Who is Affected and Why?

While athletes of all sports are susceptible for developing the female athlete triad, those athletes who participate in image base- sports are more predisposed to this condition. Sports which encourage thinness/leanness and/or a higher level of fitness and

a particular physique in order to complete and train may include, but not limited to, gymnastics, cheerleading, figure skating, running, dance, swimming, diving, and wrestling. While male athletes who participate in these sports is of concern, males are not capable of developing amenorrhea (absence of the menstrual cycle), however should be monitored for disordered eating and osteoporosis.

The Three Components of the Female Athlete Triad

9. Disordered Eating

   Disordered eating includes the full spectrum of abnormal eating behaviors, ranging from simple dieting to clinical eating disorders. (American College of Sports Medicine, 1997) Athletes develop disordered eating patterns due to numerous causes, whether inadvertent, such as mistakenly eating too little to adequately fuel their body, or those athletes who intentional restrict their daily intake in order to be thinner or leaner such as the pressures of being lean, outside pressure from parents, coaches and fellow athletes, following athletic injury(s), and psychological concerns. Athletes in either case try and hide or deny the occurrence of disordered eating patterns fearing being caught or embarrassed.

10. Amenorrhea

    Amenorrhea is the absence of the menstrual cycle for greater than three menstrual cycles in a row or a female who hasn't begun menstruating by the age of sixteen. The occurrence of amenorrhea may be brought on by higher intensity training (time, duration, etc.), a decrease in caloric intake, or combination of these two factors. Pregnancy and other medical conditions should be ruled out by a physician.

11. **Osteoporosis**

    The third component of the female athlete triad, osteoporosis, is a disease characterized by low bone mass and deterioration of bone tissue, resulting in bone fragility and increase risk for fracture. (National

Osteoporosis Foundation, 2003) Osteoporosis can be brought on by a lack of nutrition (disordered eating) and the loss of menstruation (amenorrhea). The loss of menstruation (amenorrhea) causes lower/absent levels of estrogen in female athletes, resulting in a decrease in bone growth, and bone reabsorption.

Signs & Symptoms

Physical

- Amenorrhea
- Dehydration
- Gastrointestinal Problems
- Hypothermia (Cold Intolerance)
- Stress Fractures (and overuse injuries)
- Significant Weight Loss
- Muscle cramps, weakness or fatigue
- Dental and gum problems
- Excessive Exercise
- Hair Loss
- Fatigue
- Noticeable Weight Loss
- Dry Skin
- Dieting
- Frequent Trips to the Bathroom After Eating
- Increased Healing Time After Injuries Irregular
- Periods or Loss of Menstruation
- Increased Occurrence of Fractures
- Excessive use of the restroom
- Excessive exercises
- Preoccupation with weight and eating
- Avoidance of eating and eating situations
- Use of laxatives, diets pills, etc.

Psychological

- Anxiety and/or depression
- Low Self Esteem
- Claims of feeling fat despite being thin
- Unfocused, difficult concentrating

Treatment

Having a policy on how to manage these athletes and situations is imperative. The treatment approach for the female athlete triad will involve the combined efforts of healthcare professionals such as physician(s), nutritionist, and mental health specialist(s) who have expertise and experience in treating and managing these individuals. Educational awareness for all those involved in athletics and maintaining privacy for those affected athletes is instrumental for success.

PREGNANCY AND ATHLETES

- 750,000 teens between the ages of 15 and 19 become pregnant each year.
- Teen mothers account for 11% of all birth sin the United States.
- There is no definitive point during pregnancy when a female athlete should cease competition; decisions regarding participation should be made by the female athlete in conjunction with her healthcare provider. The NCSS suggests that you also obtain parental permission for minors.
- A coach or athletic trainer should treat pregnancy like any other type of temporary medical condition. The physician in conjunction with the athlete should determine the length of participation and any activity restrictions.

According to the NCAA guidelines:

- A school cannot discriminate against any student athlete who becomes pregnant.
- A school may require the student athlete to obtain assigned certification from her doctor to continue to play sports.
- A school shall treat pregnancy as a temporary disability.

When to Stop Exercising if Pregnant Signs:

- Vaginal bleeding
- Shortness of breath before exercises
- Dizziness
- Headache
- Chest pain
- Calf pain or swelling
- Preterm labor
- Decrease fetal movement
- Amniotic fluid leakage
- Muscle weakness

SLEEP

Many children, adolescents and teenagers do not get enough sleep and are sleep deprived. Contributing factors requiring a balance of time management include: school, homework, after school activities, athletics, jobs, chores amongst other responsibilities. In fact, only 15% of teens surveyed in a study reported getting 8 and half hours of sleep a night. Not getting enough good sleep each night can affect your mood and concentration and even effect athletic performance. The National Sleep Foundation recommended that:

- Toddlers (1-3 years old) need about 12-14 hours of sleep in a 24-hour period
- Preschooler (3-5 years old) need about 11-13 hours of sleep each night
- School-Aged (5-12 years old) need 10-11 hours of sleep each night
- Teens (12-17 years old) need 8.9-9.5 hours of sleep each night
- Adults (18+ years old) need 7-9 hours of sleep each night

Sleep and Travel

Athletics today, not only involves athletes traveling outside their communities but traveling outside their state and region in order to complete. With that in mind, it is advised that you be aware of time zone changes and jet lag concerns when traveling aboard and how it may affect your sleeping patterns.

Signs and Symptoms of Lack of Sleep

- Change of moods
- Decision making skills changes
- Decrease in physical strength
- Decrease in alertness
- Increase in fatigue
- Athletic performance changes
- Decreased motivation to exercises
    - Decreased physical tasks
    - Increase complexity of tasks
    - Increase degree of exertion
    - Disease fitness level
    - Low body temperature
    - Decrease quantity and quality of sleep
    - Energy deficit
    - Environmental stress
    - Lack of previous
    - Youth athletes

Signs and Symptoms of Jet Lag

- Sleep disorders
- Difficulties with concentration
- Irritability
- Depression
- Disorientation
- Distorted estimation of time, space, and distance
- Lightheadedness
- Loss of appetite
- Gastro intestinal disturbances

Getting Enough Sleep

- Establish a regular sleeping pattern
- Establish a routine prior to going to sleep
- Avoid stimulants(caffeine, soda, coffee, teas, energy drinks) prior to going to sleep
- Avoid alcohol and nicotine prior to going to sleep
- Avoid heavy meals prior to going to sleep
- Avoid napping close to your regular sleeping pattern time
- Practice a relaxing bed time ritual
- Avoid electronics (television, cell phones, text messaging, videogames)
- Exercises daily
- Evaluate your sleeping environment
- Avoid a noisy environment
- The preferred temperature can vary person-to-person
- Sleep in a darker room
- Sleep on a comfortable surface

SUMMARY

- It is important for coaches to understand general sports medicine terminology, as well as be familiar with common athletic related injuries for the upper and lower extremity.
- It is important for athletes of all levels to incorporate a verity of different carbohydrates, proteins and fats into their regular diet, as well as maintain proper hydration.
- Athletes should be encouraged to have a food-first mentality and avoid dietary supplementation.
- Athletes are ultimately response for all substance (medication, supplements, and performance enhancing drugs) that they put into their body.
- Sudden Cardiac Arrest is the leading cause of death among young athletes.
- Factors contributing to commotio cordis include small, dense objects, the timing of the impact and an impact directly over the heart.
- Commotio cordis occurs most frequently in baseball, softball, ice hockey, football, soccer, cricket and lacrosse.
- An AED is critical in the care for cases of SCA and SCD.
- The components of the Female Athlete Triad include Disordered eating, Amenorrhea and Osteoporosis.
- Schools and recreational leagues cannot discriminate against any student athlete who becomes pregnancy.
- Not getting enough good sleep each night can affect your mood, concentration and even athletic performance.
- Jet lag and the changing of time zones can affect sleeping patterns.

POLICY LINKS

APPROPRIATE MEDICAL COVERAGE

NATA Recommendations and Guidelines for Appropriate Medical Coverage of Intercollegiate Athletics
http://www.nata.org/sites/default/files/AMCIARecsandGuides.pdf

NATA Consensus Statement for Appropriate Medical Care for Secondary School Age Athletes
http://www.nata.org/sites/default/files/AppropriateMedicalCare4SecondarySchoolAgeAthletes.pdf

Summary Statement: Appropriate Medical Care for Secondary School Age Athletes
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2474822/

HEAT ILLNESS

NATA Preseason Heat-Acclimatization Guidelines for Secondary School Athletics' Consensus Statement
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2474822/http://www.nata.org/sites/default/files/NATA09AnnualMeetingLeadRelease.pdf

NATA Position Statement: Fluid Replacement for Athletes
http://www.nata.org/sites/default/files/FluidReplacementsForAthletes.pdf

NATA Position Statement: Exertional Heat Illness
http://natajournals.org/doi/pdf/10.4085/1062-6050-50.9.07

Inter-Association Task Force on Exertional Heat Illnesses
http://stopsportsinjuries.reingoldweb.com/files/pdf/Exertional-Heat.pdf

LIGHTNING

NATA Position Statement: Lightning Safety for Athletics and Recreation
http://natajournals.org/doi/pdf/10.4085/1062-6050-48.2.25

NCAA Guidelines: Lightning Safety
http://www.lightningsafety.com/nlsi_pls/Sports_Medicine_Handbook_lightning.pdf

EMERGENCY ACTION PLANNING

NATA Position Statement: Emergency Planning in Athletics
http://www.nata.org/sites/default/files/EmergencyPlanningInAthletics.pdf

CONCUSSIONS

NATA Position Statement: Management of Sports Related Concussions
http://natajournals.org/doi/pdf/10.4085/1062-6050-49.1.07

SPEARING

NATA Position Statement: Head Down Contact and Spearing in Tackle Football
http://www.nata.org/sites/default/files/HeadDownContactAndSpearingInTackleFB.pdf

Consensus Statement: NATA Position Statement: Head Down Contact and Spearing in Tackle Football
http://stopsportsinjuries.reingoldweb.com/files/pdf/Football-Head-Injuries.pdf

SUDDEN CARDIAC DEATH

NATA Position Statement: Preventing Sudden Death in Sports
http://www.nata.org/sites/default/files/Preventing-Sudden-Death-Position-Statement_2.pdf
Consensus Statement: Emergency Preparedness and Management of Sudden Cardiac Arrest in High School and College Athletic Programs
http://stopsportsinjuries.reingoldweb.com/files/pdf/Sudden-Cardiac-Arrest.pdf

STEROIDS

NATA Position Statement: Anabolic-Androgenic Steroids
http://www.nata.org/sites/default/files/position-statement-steroids.pdf

NFHS Position Statement on Steroids http://www.osaa.org/healthandsafety/steriods.pdf

NSCA: Steroids: Special Report
www.nsca-lift.org/WorkArea/DownloadAsset.aspx?id=3417

ASTHMA

NATA Position Statement: Management of Asthma in Athletes
http://www.nata.org/sites/default/files/MgmtOfAsthmaInAthletes.pdf

National Heart and Lung Association: Asthma Position Statement
http://www.lung.org/associations/charters/northeast/assets/pdfs/public-policy/position-statements/asthma-position-statement.pdf

AUTOMATED EXTERNAL DEFIBRILLATOR (AED)

United State Department of Labor
http://www.osha.gov/SLTC/aed/index.html

National Association for Sports and Physical Education Position Statement: Availability and Access to Automated External Defibrillators During Participation in Physical Activity
http://www.aahperd.org/naspe/standards/spos.cfm

National Center for Early Defibrillation: American College of Emergency Physicians Position Statement
http://www.early-defib.org/03_04.html

INFECTIOUS DISEASE

NATA Position Statement: Skin Diseases
http://www.nata.org/sites/default/files/position-statement-skin-disease.pdf

SPINE EMERGENCY CARE

NATA Position Statement: Acute Management of Cervical Spine Injured Athlete
http://www.nata.org/sites/default/files/AcuteMgmtOfCervicalSpineInjuredAthlete.pdf

NATA: Prehospital Management for The Spine Injured Athletes
http://www.nata.org/sites/default/files/executive-summary-spine-injury-updated.pdf

OVERUSE INJURIES

NATA Position Statement: Prevention of Pediatric Overuse Injuries
http://www.nata.org/sites/default/files/Pediatric-Overuse-Injuries.pdf

DISORDERED EATING

NATA Position Statement: Preventing, Detecting, and Managing Disordered Eating in Athletes
http://www.nata.org/sites/default/files/PreventingDetectingAndManagingDisorderedEating.pdf

DIABETES

NATA Position Statement: Management of the Athlete with Type I Diabetes Mellitus
http://www.nata.org/sites/default/files/MgmtOfAthleteWithType1DiabetesMellitus.pdf

COLD ILLNESS

NATA Position Statement: Environmental Cold Injuries
http://www.nata.org/sites/default/files/EnvironmentalColdInjuries.pdf

SUDDEN DEATH

Inter-Association Task Force for Preventing Sudden Death in Collegiate Conditioning Sessions: Best Practice Recommendations
http://www.nata.org/sites/default/files/preventingsuddendeath-consensusstatement.pdf

SICKLE CELL

The Sickle Cell Trait and the Athlete
http://www.nata.org/sites/default/files/SickleCellTraitAndTheAthlete.pdf

COMMOTIO CORDIS

NATA Official Statement on Commotio Cordis
http://www.nata.org/sites/default/files/CommotioCordis.pdf

REFERENCES

1. Casa, DJ Armstrong, LE, Hillman, SK. Et al. (2002). National Athletic Trainers' Association Position Statement: Fluid Replacement for Athletes. Journal of Athletic Training. 35(2):212-224.
2. American Heart Association.
3. National Athletic Trainers' Association Position Statement: Community-Acquired MRSA Infections (CA-MRSA) (2005).
4. Walsh, KM, Bennett, B, Cooper, MA, et al. (2000). National Athletic Trainers' Association Position Statement: Lightning Safety for Athletic and Recreation. Journal Athletic Training 34(4):471-477.
5. American Academy of Family Physicians' Pre-Participation Physical Form (http://www.aafp.org/afp/20000815/ppeform1.pdf).