



## **US Lacrosse Policy Statement on Lightning**

### **Background**

Lightning occurs when a combination of natural weather conditions come together to create an electrical impulse. Lightning can occur many miles from the parent thunderstorm – outside the actual storm and visible thundercloud. Caution must be exerted as the storm approaches and for a substantial time period after the storm. Lightning cannot occur in the absence of thunder; however thunder is not always heard.

Approximately 1/3 of all individuals struck by lightning are involved in some type of recreational activity, either as a participant or as a spectator. Within the United States, the National Oceanographic and Atmospheric Administration (NOAA) estimates that 60-70 fatalities and about 10 times as many injuries occur from lightning strikes every year. Understanding basic lightning principles and following proper safety precautions can decrease the risk of lightning related injury.

In preparation for practice and games, it is important that an emergency action plan (EAP) is in place, and that preparation for thunderstorms, lightning and other weather-related issues are considered as part of the EAP. Education, prevention and planned access to early defibrillation are essential for weather related injury.

Several resources are available that discuss lightning related injury including the National Weather Service (NWS), National Collegiate Athletics Association (NCAA), National Federation of State High School Associations (NFHS), and the National Athletic Trainers Association (NATA). These resources and other scientific references were utilized to form the following US Lacrosse recommendation. .

### **US Lacrosse Recommendation**

It is the recommendation of US Lacrosse that all organizations, facilities, administrators, athletic medicine staff and coaches follow an EAP with specific guidelines for severe weather that may include lightning. The EAP should be developed by those who are familiar with the athletic venue as well as surrounding emergency medical facilities. It is important that anyone using the facility is aware of the EAP specific to that site, including organizing bodies, administrators, coaches and athletes.

## **Emergency Action Plan; Weather Related Issues**

The EAP should include the following components:

**1) Established Chain of Command;** There is generally a hierarchy of individuals responsible for game management and medical issues as well as determining if play should be suspended. Individuals included in this chain of command can include administrators, officials, physicians, certified athletic trainers, coaches, parents, and athletes.

- Rule books put the authority in the hands of the referee to make the call to leave the field in inclement weather. However, it is important that members of the coaching staff as well as others provide input to the officials prior to the decision to seek safe shelter. At a practice, coaches, athletic trainers, and other personnel are urged to follow these recommendations to provide a safe environment.

**2) Designated Person to Monitor Weather;** A designated person to watch the weather and evaluate whether the activity should be suspended or postponed. Prior to the individual practice/game, the outdoor weather should be noted. If a thunderstorm is imminent, the practice/game should be suspended or postponed. Imminent refers to dark clouds with winds picking up in intensity, sounds of thunder, or lightning in the distance. Such conditions indicate that the weather is not conducive to safe playing and spectating conditions. If practice or play has already begun, any sign of an imminent storm should be watched for and cessation of play considered. It must also be remembered that sounds of thunder can be diminished in urban areas, by surrounding mountains, trees, or buildings. Therefore, if lightning is seen, activities should be suspended and participants and spectators should head for designated safer locations.

**3) Weather Monitoring.** Several forms of weather monitoring exist, including local television news coverage, Internet, cable and satellite weather programming, lightning monitoring systems, and the National Weather Service ([www.weather.gov](http://www.weather.gov)). The National Weather Service issues thunderstorm “watches” or “warnings”, where the former means that severe weather is likely to develop in an area, and the latter meaning that severe weather has been reported in the area. Both “watches” and “warnings” should signify an elevated level of concern for the possibility of lightning.

If more sophisticated monitoring is not available, the “flash-to-bang standard” can be used to estimate the distance to a lightning flash. The flash-to-bang method does not require any sophisticated equipment and is thus convenient and can be used to determine when to suspend or postpone activities. The flash-to-bang method is based on the fact that light travels faster than sound. To use the flash-to-bang method, begin counting on the lightning flash, and stop counting when the associated clap of thunder is heard. Divide the time to thunder (in seconds) by 5 to determine the distance (in miles) to the lightning flash. For example, an observer obtains a count of 30 seconds from the time he or she spots the flash to when the thunder is heard. Thirty divided by 5 equals 6, therefore that lightning flash was 6 miles from the observer.

**4) Lightning Structures;** Understanding the location of all structures close to the facility that are considered safe from lightning hazard

**a) Safe locations;**

- A building normally occupied by people, with wiring and plumbing that has been grounded.
- If buildings are not available, then certain other spaces are considered safe: vehicles, including school buses, with a hard metal roof (not convertibles or golf carts) with the windows shut. Individuals should not touch the metal framework of the vehicle as well as the steering wheel, ignition keys, and/or radio.

**b) Unsafe locations;**

- The showers or plumbing of a building. as well as electrical appliances in a building during a thunderstorm should be avoided.
- Small covered shelters outside, such as dugouts, bleachers, rain shelters, golf shelters, picnic shelters.
- Areas connected to or near light poles, towers and fences
- Any location which is the highest point in the area

**5) Evacuation;** If lightning is seen or thunder is heard, then preparing for evacuation should occur. Once lightning is detected and felt to be within 6 miles, all individuals should already be in safe structures and play should be suspended for 30 minutes. This requires awareness of the weather conditions as well as understanding how long it will take for participants and spectators to get to the safe structures. This should be considered in the EAP for each facility such that appropriate announcements can be made to spectators, play can be suspended and both spectators and participants can be safely accommodated.

**6) Lightning Related Strategies;** Education regarding the following specific strategies can diminish the likelihood of lightning related injury.

- Once there is less than 30 seconds between the sight of lightning and the sound of thunder, all individuals should be cleared from the field and in a safe location.
- During sporting events, thunder may be hard to hear. During the day, lightning may be difficult to see. In addition, 10% of lightening occurs when no rainfall is evident, and there is a blue sky.

- **Phones;** Cell phones and cordless phones are preferred over landlines as the latter have been associated with lightning strikes. Ideally, cell phones and cordless phones should be used within a safe location.
- **Imminent Lightning;** If one feels the hair on their head, neck or arms stand on end, or feel skin tingling, then a lightning strike may be imminent. In this situation, if a safe location is not nearby, move several feet away from others and use the "lightning crouch" to minimize one's risk. Put the feet together, squat down, tuck the head and cover the ears. When immediate threat of lightning has subsided go to a safe shelter. If a safe shelter is not available, seek the lowest elevation (avoid being the highest elevation where lightning is most likely to strike).
- **Resumption of Activity;** There should be 30 minutes between the last sound of thunder and the last flash of lightning before activity is resumed. The 30 minute clock may be re-set as more activity is heard or seen. During evening activities, lightning may persist despite being far away, and the lightning channel (from the sky to the ground) should be used. More sophisticated weather review systems (internet based systems showing the exact distance of the storm as well as the direction it is moving) can be particularly useful in this regard.
- **If Lightning Strikes;** Individuals that have been struck by lightning do not carry an electrical charge and therefore resuscitation efforts should not be delayed. Emergency treatment, including the activation of the EMS system by calling 911, applying an automatic external defibrillator (AED) and performing cardiopulmonary resuscitation (CPR), in that order, should be initiated as soon as possible. If possible, the victim should be moved to a safer location prior to initiating emergency measures.

## References & Resources

Bennett BL: A model lightning safety policy for athletics. J Ath Train 1997 32(3):251-253.

Cooper MA, Andrews CJ, Holle RL, Lopez RE: Lightning Injuries. In Auerbach et. Management of Wilderness and Environmental Emergencies. 5<sup>th</sup> ed. C.V. Mosby, 2007;67:108.

Highlights of the 2010 American Heart Association Guidelines for CPR and ECC. Available at [http://www.heart.org/idc/groups/heart-public/@wcm/@ecc/documents/downloadable/ucm\\_317350.pdf](http://www.heart.org/idc/groups/heart-public/@wcm/@ecc/documents/downloadable/ucm_317350.pdf). Accessed October 31, 2010.

Lightning Strike and Electric Shock Survivors network: [www.lightning-strike.org](http://www.lightning-strike.org)

National Collegiate Athletics Association (NCAA) Sports Medicine Handbook; 2010-2011. Copyright 2010. pp 13-16. Available at [www.ncaa.org/health-safety](http://www.ncaa.org/health-safety). Accessed October 31, 2010.

National Federation of State High School Association Guidelines for Lightning. Available at [www.nfhs.org](http://www.nfhs.org). Accessed October 31, 2010

National Lightning Safety Institute website. Available at [www.lightningsafety.com](http://www.lightningsafety.com). Accessed October 31, 2010.

National Lightning Detection Network (NLDN): [www.lightningsafety.com](http://www.lightningsafety.com)

NOAA Lightning safety website. Available at [www.lightningsafety.noaa.gov](http://www.lightningsafety.noaa.gov)

Pirce TG, Cooper MA: Electrical and Lightning Injuries. In: Marx et al. Rosen's Emergency Medicine Concepts and Clinical Practice, Mosby, 6<sup>th</sup> ed 2006;22:67-78.

Walsh KM, Bennett BL, Holle RL, Cooper MA, Kithil R: National Athletic Trainers Association Position Statement, Lightning Safety for Athletics and Recreation. J Athl Train 2000 35(4):471-477.