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## Acknowledgments

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# Introduction

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It is the recommendation of USA Lacrosse that:

- all organizations, facilities, administrators, athletic medicine staff and coaches follow a specific written policy for lightning-related events.
- the lightning guidelines be developed by those who are familiar with the athletic venue as well as surrounding emergency medical facilities
- anyone using the facility is aware of the policy specific to that site, including organizing bodies, administrators, coaches, and athletes.

It is important to have a clear and practiced plan for the management of lightning related events. **This document was created to contain guidelines on lightning related events, for organizations, facilities, administrators, and athletic medicine staff, during emergencies.** Lightning can be unpredictable and dangerous, and no policy or guidelines can guarantee absolute safety. Organizations and individuals are ultimately responsible for their own safety and should exercise caution and good judgement in all situations involving lightning. The words and other content provided in these guidelines, in any linked materials or referenced resources ("referenced materials") are not intended and should not be construed as professional advice.

We believe that the Healthcare providers who are responsible for caring for the lacrosse athletes should be familiar with the emergency action plan (EAP) of the host site and work with the local EMS to provide care for an injured athlete. These are guidelines only and are not intended as a standard of care and should not be interpreted as such. Individual treatment will depend on the specific facts and circumstances presented to the healthcare provider(s) managing care.

Never disregard professional medical advice or delay in seeking it because of something you have read in these guidelines or referenced materials. **In the event of a medical emergency and a licensed medical professional is not available, call 911 immediately.**

The views expressed within these guidelines or referenced materials have no relation to those of any academic institution with which the authors are affiliated.



## SECTION 1.

# Background



## Background

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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, especially in large crowds, and at events with announcers, bands, etc. Importantly, all lightning is dangerous, whether intracloud (or cloud-to-cloud) lightning or cloud-to-ground.

Approximately 62% of all individuals struck by lightning are involved in some type of leisure activity, either as a participant or as a spectator. 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 organizations develop a lightning policy, including identifying who is responsible for monitoring the environment, the criteria to evacuate the venue, and the criteria to return to activity, amongst others. 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 USA Lacrosse recommendation.



## SECTION 2.

# Creating a Lightning Policy



# Creating a Lightning Policy

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A lightning policy should include the following components:

## 1. Assigned individual for monitoring the weather

A designated person to watch the weather and evaluate if the activity should be suspended or postponed. 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" (likely to develop in the area) or "warnings" (reported in the area). Both "watches" and "warnings" should signify an elevated level of concern for the possibility of lightning in the area.

## 2. Assigned individual responsible for decision to suspend/return to activity

A designated individual assigned to be responsible for making the decision for when to suspend activity, evacuate the area, and (when safe) return to the activity. This individual should have unchallengeable authority to make the decision. In other words, the individual should be able to make the decision to suspend activity and not be able to be overturned by any other individual at the event. This allows for streamlined communication and efficient evacuations.

## 3. Criteria to suspend activity and evacuate area.

When lightning, the sound of thunder, or the leading edge of a storm is within 5 nautical miles of the venue, the start of the activity should be delayed and, if play has already begun, then the activity should be suspended. In both cases (a delayed start or suspension of play), the venue should be evacuated. Keep in mind, the sound of thunder can be diminished by the surrounding area (tall buildings, mountains, trees) and so, the old-mantra "Flash (sight of lightening) to Bang (sound of thunder)" is **unreliable** and **outdated**, thus it should **never** be used when deciding when to evacuate a venue. Therefore, when lightning is seen, activities should be suspended, and participants and spectators should be evacuated to designated safe locations. The criteria to suspend activity and evacuate should also consider how long it will take for all participants and spectators to get to the venue-specific safe structures. This will inform when announcements should be made to evacuate.

#### **4. Evacuation procedure and location of a venue-specific safe structure.**

Clear communication should be provided for the location of venue-specific safe structures during a weather-related evacuation. All support personnel should know the location(s) of all venue-specific safe structures in order to efficiently direct spectators to those locations that are considered safe from lightning hazard.

*Safe Structures* are defined as substantial, fully enclosed buildings or vehicles.

*Unsafe Locations* include any location which is the highest point in the area; areas connected to or near light poles, towers, and fences; small, covered shelters outside, (e.g., dugouts, bleachers, rain/golf/picnic shelters). The showers or plumbing of a building, as well as electrical appliances in a building should be avoided during a thunderstorm.

#### **5. Procedures describing the duration of suspension 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 needs to be re-set when more thunderstorm activity is heard or seen. During evening activities, lightning may persist despite being far away, and the lightning path (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.

#### **6. Description of communication methods.**

Communicating the evacuation is important to ensure a quick and efficient process and help prevent a catastrophic outcome. Communicating the 'all clear' and allowing the activity to resume as well as spectators to return is also important. All personnel need to know the methods by which these communications will occur ahead of time. For example, an organizations might use a loudspeaker to make the announcement at a single field event, or perhaps a group text will be sent to all head coaches at a multi-field event. This allows those involved to know how and when they will receive communication and who it will be coming from with respect to suspension of play and return to activity.

#### **7. Documentation for non-compliance.**

In the unfortunate event that individuals refuse to comply with evacuation orders, then documentation is needed to describe the events that led up to and included the individual refusing to evacuate. Thorough documentation serves as evidence of an evacuation order communicated to the individual and their refusal to comply. Organizations should develop a



plan describing the circumstances for when documentation is required, what information needs to be documented, who is responsible for completing the documentation, and the specific form that should be filled out.

### **8. Treatment protocols for lightning strike.**

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. Individuals that have been struck by lightning do not carry an electrical charge and therefore resuscitation efforts should be applied immediately as long as the area is safe to do so. Therefore, if possible, the victim should be moved to a safer location prior to initiating emergency measures.

### **9. Training/retraining procedures of key personnel.**

Individuals responsible for the successful implementation of the lightning policy should be well informed and/or trained on the policy. Informing these individuals ahead of time allows for proactive communication of the requirements for the organization. This is especially important when informing individuals of who is responsible for weather watching, decision making, criteria and process for venue evacuation, and the return to activity. For healthcare professionals, such as athletic trainers, this training would also include reviewing the procedures for how to respond to a lightning strike (e.g., cardiac arrest management and shock procedures). The policy should describe when the training will occur (e.g., annually, prior to the season/events).

### **10. Approval process for the policy.**

Policy development is an essential component for a weather-related risk management plan. The development of a lightning policy allows for proactive planning to reduce (or eliminate) the risk of a lightning strike to participants, coaches, officials, spectators, or others in the area. As a part of the policy development process, the organization should identify the steps and personnel needed to approve the final version of the document.

## References

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