

# ENVIRONMENTAL ISSUES

## Lightning Safety

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- Education and prevention are the keys to lightning safety.
- Practice and competitions should be immediately suspended as soon as lightning is seen or thunder is heard.
- All athletes and spectators should seek safe shelter during severe weather.
- Play should not resume for at least 30 minutes after the last lightning strike or thunderclap.

### SIGNIFICANCE

Lightning is one of the most consistent causes of weather-related deaths and injury in the U.S. According to the National Severe Storms Laboratory, there are approximately 100 lightning-related deaths and over 1000 injuries yearly.

### BACKGROUND

Lightning-related injuries mainly occur between May and September. Most lightning-related casualties happen between 10 a.m. and 7 p.m., with the majority of those occurring between 2 p.m. and 6 p.m. Therefore, the risk of lightning-related injury appears to be highest during some of the most active periods for outdoor athletic activities. The average distance between successive lightning flashes is about two to three miles, which means that **risk is present WHENEVER lightning can be seen or thunder can be heard.**

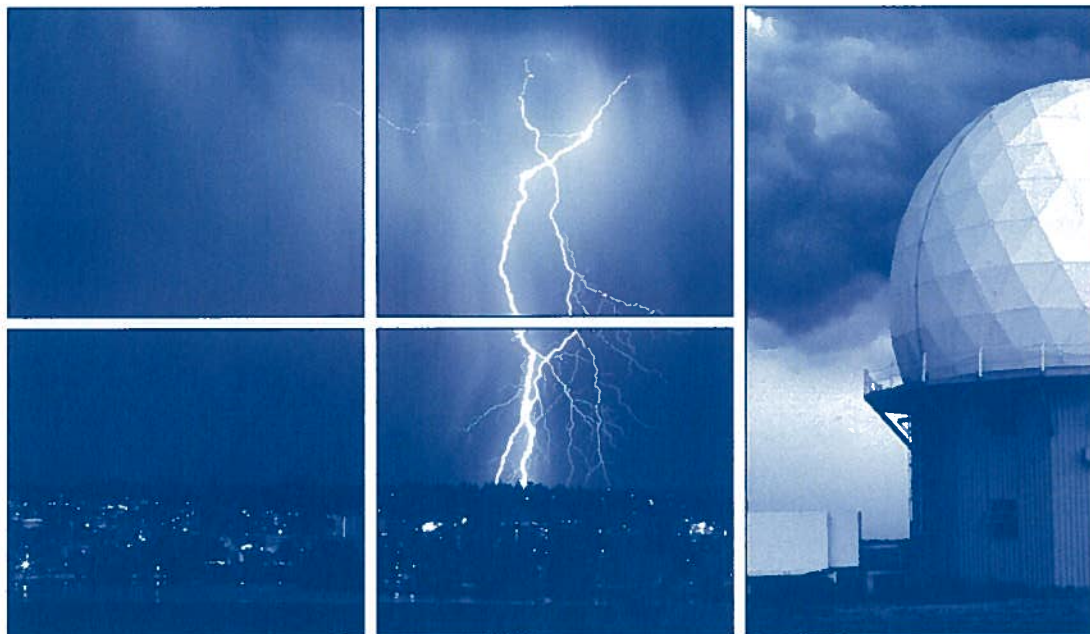
Game administrators, officials and the sports medicine staff can be aware of adverse weather by following local forecasts and by monitoring the National Weather Service (NWS). The NWS issues storm watches and warnings during times of severe weather. A watch means that the conditions are favorable for severe weather to develop, while a warning indicates severe weather has been reported and appropriate precautions should be taken. It must be remembered that any thunderstorm poses a risk of injury, even if not deemed "severe" by the NWS.

### MANAGEMENT

As soon as lightning is seen or thunder is heard, practice and competition should be suspended immediately. A **Lightning Safety Plan** should be a component of the Emergency Action Plan (see Emergency Action Plan chapter) and should be in place for every sport and facility. This plan should contain instructions for participants and spectators, designation of safe shelters, and designation of warning and all clear signals. This plan must be disseminated to the proper personnel and reviewed and practiced on a routine basis.

There should also be a systematic plan for monitoring weather. The weather forecast should be closely followed throughout the day prior to any practice or competition. A weather radio is helpful in providing current information. Weather can also be monitored over the Internet or through the use of lightning strike monitors. However, such

technology should never be a substitute for directly hearing or seeing dangerous weather. There should also be one person designated to monitor threatening weather and make decisions regarding participation. However, if anyone hears thunder or sees a lightning strike, appropriate action should begin.



**If lightning is imminent or a thunderstorm is approaching, all personnel, athletes and spectators should be evacuated to safe structures.** A list of the closest safe structures should be announced and displayed on placards at all venues. The ideal safe structure is a fully enclosed building with plumbing, telephone and electrical service, which aid in grounding the structure. A fully enclosed automobile or school bus with all of the windows rolled up is a reasonable shelter, although care must be taken to avoid contact with any metal inside the vehicle. The hard metal frame and roof, not the rubber tires, dissipate the current around the vehicle. Golf carts and convertible cars are not safe shelters. Dugouts and golf shelters are not safe shelters and are not grounded for the effects of lightning.

Avoid the use of shower facilities for shelter and do not use showers or plumbing during a thunderstorm as the electrical current from lightning can enter the building through plumbing connections. It is also unsafe to stand near utilities or use a landline telephone during a thunderstorm because of the risk of the current traveling through the lines. Cellular and cordless telephones are considered to be safe.

If a suitable safe shelter is not available, it is best to avoid tall objects (trees, light poles, etc) that allow lightning an easy path to the ground. It is important to avoid being the tallest object. In an open field, people should crouch with their legs together, the weight on the balls of their feet, arms wrapped around their knees, and head down with their ears covered. The person should minimize contact with the ground and should NOT lie flat.

People who have been struck by lightning do not carry an electric charge. Therefore, it is safe to perform CPR, if needed. Ideally, injured persons are moved into a safe shelter. Lightning-strike victims who show signs of cardiac or respiratory arrest need emergency help.

## RETURN TO PLAYING FIELD

The NFHS recommends following the 30-minute rule when making return-to-play decisions. After the last flash of lightning is witnessed or the last thunderclap is heard, it is recommended to wait at least 30 minutes before resuming practice or competition. Given the average rate of thunderstorm travel, the storm should move 10 to 12 miles away from the area, reducing the risk of local lightning strike. **Any subsequent lightning strike or thunder after the beginning of the 30-minute count should reset the clock and another count should begin.**

## PREVENTION

In order to prevent lightning-related injuries, it is important to formulate and implement a Lightning Safety Plan and provide adequate education for all athletes and personnel. The plan needs to be reviewed and practiced periodically. The plan also must include a systematic approach for monitoring local weather activity and recognizing signs of nearby danger (thunder and lightning strikes). Criteria for suspension and resumption of activity should be clear. Appropriate safe shelters for each athletic venue should be clearly identified.

## References

- Bennett BL. A model lightning safety policy for athletics. *Journal of Athletic Training* 1997;32:251-253.
- Cooper MA, et al. Lightning injuries. In: Auerbach PS, ed. *Management of Wilderness and Environmental Emergencies*. 5th ed. C.V. Mosby, 2007:68-108.
- Holle R, Lopez R. Lightning-impacts and safety. *WMO Bulletin* 1998;47:148-155.
- National Collegiate Athletic Association. Guideline 1d: Lightning safety. 2010-11 *Sports Medicine Handbook* (21st edition).

## Resources

- [www.lightningsafety.com](http://www.lightningsafety.com)
- [www.weather.com](http://www.weather.com)
- [www.weather.gov](http://www.weather.gov)