



GUIDELINE 1d

Lightning Safety

July 1997 • Revised June 2003

The NCAA Committee on Competitive Safeguards and Medical Aspects of Sports acknowledges the significant input of Brian L. Bennett, ATC, College of William and Mary, and Ronald L. Holle and Raul Lopez of the National Severe Storms Laboratory, in the development of this guideline.

Lightning is the most consistent and significant weather hazard that may affect intercollegiate athletics. Within the United States, the National Severe Storms Laboratory (NSSL) estimates that 100 fatalities and 400-500 injuries requiring medical treatment occur from lightning strikes every year. While the probability of being struck by lightning is extremely low, the odds are significantly greater when a storm is in the area and the proper safety precautions are not followed.

Prevention and education are the keys to lightning safety. Education begins with background information on lightning. The references associated with this guideline are an appropriate resource. Prevention should begin long before any intercollegiate athletics event or practice. The following steps are recommended by the NCAA and NSSL to mitigate the lightning hazard:

1. Designate a chain of command as to whom monitors

threatening weather and who makes the decision to remove a team or individuals from an athletics site or event. An emergency plan should include planned instructions for participants as well as spectators.

2. Obtain a weather report each day before a practice or event. Be aware of potential thunderstorms that may form during scheduled intercollegiate athletics events or practices.

3. Be aware of National Weather Service-issued (NWS) thunderstorm “watches” and “warnings” as well as the signs of thunderstorms developing nearby. A “watch” means conditions are favorable for severe weather to develop in an area; a “warning” means that severe weather has been reported in an area and for everyone to take proper precautions.

4. Know where the closest “safe structure or location” is to the field or playing area, and know how long it takes to get to that safe structure or location.

Safe structure or location is defined as:

a. Any building normally occupied or frequently used by people, i.e., a building with plumbing and/or electrical wiring that acts to electrically ground the

structure. Avoid using shower facilities for safe shelter and **do not use** the showers or plumbing facilities during a thunderstorm.

b. In the absence of a sturdy, frequently inhabited building, any vehicle with a hard metal roof (not a convertible or golf cart) and rolled-up windows can provide a measure of safety. A vehicle is certainly better than remaining outdoors. It is not the rubber tires that make a vehicle a safe shelter, but the hard metal roof which dissipates the lightning strike around the vehicle. **DO NOT TOUCH THE SIDES OF THE VEHICLE!**

5. Be aware of how close lightning is occurring. The flash-to-bang method is the easiest and most convenient way to estimate how far away lightning is occurring. Thunder always accompanies lightning, even though its audible range can be diminished due to background noise in the immediate environment, and its distance from the observer. To use the flash-to-bang method, count the seconds from the time the lightning is sighted to when the clap of thunder is heard. Divide this number by five to obtain how far away (in miles) the lightning is occurring. For example, if an individual

counts 15 seconds between seeing the flash and hearing the bang, 15 divided by five equals three; therefore, the lightning flash is approximately three miles away.

Lightning awareness should be increased with the first flash of lightning or the first clap of thunder, no matter how far away. This activity must be treated as a wake-up call to intercollegiate athletics personnel. The most important aspect to monitor is how far away the lightning is occurring, and how fast the storm is approaching, relative to the distance of a safe shelter.

Specific lightning-safety guidelines have been developed with the assistance of the National Severe Storms Laboratory (NSSL).

1. As a minimum, NSSL staff strongly recommend that by the time the monitor obtains a flash-to-bang count of **30** seconds (equivalent to six miles), all individuals should have left the athletics site and reached a safe structure or location. Athletics events may need to be terminated.

2. The existence of blue sky and the absence of rain are not protection from lightning. Lightning can, and does, strike as far as 10 miles away from the rain shaft. It does not have to be raining for lightning to strike.

3. If no safe structure or location is within a reasonable distance, find a thick grove of small trees surrounded by taller trees or a dry ditch. Assume a crouched position on the ground with only the balls of the feet touching the ground, wrap your arms around your knees and lower your head. Minimize contact with the ground, because lightning current often enters a victim through the ground rather than by a direct overhead strike. **MINIMIZE YOUR BODY'S SURFACE AREA, AND MINIMIZE CONTACT WITH THE GROUND! DO NOT LIE FLAT!** If unable to reach safe shelter, stay away from the tallest trees or objects (such as light poles or flag poles), metal objects (such as fences or bleachers), individual trees, standing pools of water, and open fields. Avoid being the highest object in a field. Do not take shelter under a single, tall tree.

4. A person who feels his or her hair stand on end, or skin tingle, should immediately crouch, as described in item 3.

5. Avoid using the telephone, except in emergency situations. People have been struck by lightning while using a land-line telephone. A cellular phone or a portable remote phone is a safe alternative to land-line phones, if

the person and the antenna are located within a safe structure or location, and if all other precautions are followed.

6. When considering resumption of an athletics activity, NSSL staff recommends that everyone should ideally wait at least 30 minutes after the last flash of lightning or sound of thunder before returning to the field or activity.

7. People who have been struck by lightning **do not** carry an electrical charge. Therefore, cardiopulmonary resuscitation (CPR) is safe for the responder. If possible, an injured person should be moved to a safer location before starting CPR. Lightning-strike victims who show signs of cardiac or respiratory arrest need emergency help quickly. Prompt, aggressive CPR has been highly effective for the survival of victims of lightning strikes.

Note: Flash-to-bang count, weather watchers, real-time weather forecasts and commercial weather warning devices are all tools that can be used to aid in decision-making regarding stoppage of play, evacuation and return to play.

Lightning Safety



References

1. American College of Emergency Physicians, Brochure: *Lightning myths v. reality. Facts from the American College of Emergency Physicians* (Washington DC).
2. Andrews CJ, Cooper MA, Darveniza M, Mackerras D: *Lightning Injuries: Electrical, Medical, and Legal Aspects*. Boca Raton, FL: CRC Press, pp. 3-4, 10-11, 13-14, 16-17, 118, 151-152, 1992.
3. Bennett BL: *A Model Lightning Safety Policy for Athletics*. *Journal of Athletic Training*, 32(3):251-253, 1997.
4. Cooper MA: *Emergent Care of Lightning and Electrical Injuries*. *Semin Neurol*. 15(3):268-278, 1995.
5. Holle RL, Lopez RE, Howard KW, Vavrek J, Allsopp J: *Safety in the presence of lightning*. *Semin. Neurol*. 15:375-380, 1995.
6. McHugh TP: *Lightning and electrical injuries*. *Critical Decisions in Emergency Medicine*. 10(3):8-14, 1996.
7. National Lightning Safety Institute, 891 North Hoover, P.O. Box 778, Louisville, Colorado, 80027 Available at: <http://www.lightningsafety.com> or e-mail at rkithil@ix.netcom.com.
8. National Severe Storms Laboratory, NOAA, 1313 Halley Circle, Norman, Oklahoma 73069. Ron Holle, Raul Lopez (405) 366-0516.
9. Uman MA: *All About Lightning*. New York: Dover Publications, pp. 17-23, 25-26, 73-79, 104-105, 113-115, 1986.
10. U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, National Weather Service, Brochure: *Thunderstorms and lightning...the underrated killers! A preparedness guide*, January, 1994.
11. Vavrek J, Holle RL, Allsopp J: *Flash to bang*. *The Earth Scientist X*(4):3-8, 1993.
12. Walsh KM, Hanley MJ, Graner SJ, Beam D, Bazluki J: *A Survey of Lightning Policy in Selected Division I Colleges*. *Journal of Athletic Training*, 32(3):206-210, 1997.
13. Walsh, K.M., et al, *National Athletic Trainers' Association Position Statement: Lightning Safety for Athletics and Recreation*. *Journal of Athletic Training*, 35(4):471-477, 2000.