

the IACUC. Third, firearm use is inherently dangerous. All state-approved hunter education programs in the United States emphasize safe techniques for handling firearms. However, under the General Duty Clause of the Occupational Safety and Health Act of 1970, employers are required to provide their employees with a place of employment that “is free from recognizable hazards that are causing or likely to cause death or serious harm to... employees”<sup>3</sup>. We accept that firearms are recognizable hazards, but the hazard is abated with safety training. The problem with accepting hunter education certification as a sufficient training is that, first, this is a lifetime certification that can be taken when the prospective hunter is as young as 10 years old (in some states there is no minimum age). In such cases, this training might not be used until decades later. Second, safety training with one type of firearm (for example, a .22-caliber rifle) might not be appropriate or sufficient for other types of firearms (such as shotguns, center-fire rifles or semi-automatic pistols). Investigators should be required to demonstrate that they have abated the hazards of firearm use.

The fourth criterion deals with proficiency, which is essential in the application of any euthanasia method. After all, without proficiency most otherwise acceptable euthanasia techniques can cause unacceptable amounts of pain and suffering. Each IACUC should come up with its own standards for demonstrating proficiency using gunshot as a euthanasia technique. We recommend, at a minimum, that principal investigators seeking permission to use gunshot provide guidelines that detail species-specific training, application and assessment of gunshot euthanasia. As with all other aspects of the protocol, the expectation then would be that researchers adhere to the protocol as written, whether in the lab or in the field. If facilities and resources allow, the IACUC may require demonstration of euthanasia-related skills (namely the ability to shoot accurately and consistently at a target, the ability to confirm the absence of a heartbeat and the ability to handle firearms safely). We believe that when investigators are conscientious about the details of their work, they make good decisions. At Great Eastern University, the IACUC should insist that researchers provide a complete account of the details for any use of gunshot as a euthanasia technique.

1. American Veterinary Medical Association. *AVMA Guidelines for the Euthanasia of Animals: 2013 Edition*. (American Veterinary Medical Association, Schaumburg, IL, 2013).
2. Sikes, R.S., Gannon, W.L. & the Animal Care and Use Committee of the American Society of Mammalogists. Guidelines of the American Society of Mammalogists for the use of wild mammals in research. *J. Mamm.* **92**, 235–253 (2011).
3. Occupational Health and Safety Act. 29 USC. Chapter 15, Section 654.

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## RESPONSE

### More comprehensive training is necessary

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The AVMA guidelines for euthanasia state that gunshot is a conditionally acceptable method for euthanasia and should be performed by “highly skilled personnel”<sup>1</sup>. Although successful completion of a locally administered hunter’s education class might qualify an individual to receive a hunting license, it does not necessarily provide competency to euthanize an animal with a gunshot to the head at close range with an appropriate firearm, in accordance with the AVMA guidelines. Given that the accuracy requirement of the local hunter’s education shooting test is only to hit the target 50% of the time and given that there is no instruction on how to verify the death of a shot animal, the class does not appear to be sufficient training to properly euthanize animals as per the AVMA guidelines. Indeed, unless the gunshot is accurately placed into the brainstem or brain according to species-specific landmarks, gunshot does not qualify as euthanasia, but is instead considered humane killing by the AVMA guidelines<sup>1</sup>.

We would recommend that those wishing to use gunshot euthanasia in their protocols continue to take the hunter’s education class in order to verify firearm safety and awareness and abide by local laws; however, investigators should also receive more targeted training for gunshot euthanasia that is

provided by the IACUC or appointed designees and is based on the AVMA Guidelines. A dedicated training session can be administered either by the designee in person or as an online training module. Such training should be made available to each research group that requires such approval, ensuring that they understand the appropriate firearms and target zone required for their protocol. This training would also incorporate methods for verifying animal death following gunshot.

The skill of the shooter is important so that gunshots hit only the correct anatomic location. The weapon and ammunition must also be carefully considered and selected in order to obtain the muzzle energy and penetration that is necessary for the size of the animal. The AVMA guidelines go into great detail and provide a chart describing the muzzle velocities of various weapons and giving recommendations on muzzle velocity for certain sizes of animals. This additional information should be included in the training class. This will allow the investigators to fully consider their choice of weapon for their target species, it will greatly increase the likelihood of a successful euthanasia procedure, and it will emphasize the importance of considering all aspects of gunshot as a method of euthanasia.

In addition, the IACUC may recommend the use of chemical immobilization or live trapping when possible before gunshot euthanasia is administered. The AVMA guidelines for euthanasia state that one of the greatest challenges in euthanizing free-ranging wildlife is the lack of control over the animal<sup>1</sup>. Thus, species-specific and situation-specific anesthetic agents can be used to immobilize the animal before shooting to ensure greater accuracy in certain circumstances.

Once the training is completed and the protocol is underway, it would then be pertinent to require a post-approval monitoring visit or report to ensure compliance with AVMA guidelines.

1. American Veterinary Medical Association. *AVMA Guidelines for the Euthanasia of Animals: 2013 Edition*. (American Veterinary Medical Association, Schaumburg, IL, 2013).

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