



August 7, 2020

Patricia A. Brown, VMD, MS, DACLAM  
Director, Office of Laboratory Animal Welfare  
6700B Rockledge Drive, Suite 2500  
Bethesda, Maryland 20892-6910

**RE: Public Comments on Implementation of the AVMA Guidelines for the Euthanasia of Animals: 2020 Edition**

Dear Dr. Brown:

Thank you for sharing public comments submitted to the NIH Office of Laboratory Animal Welfare (NIH OLAW) on the AVMA Guidelines for the Euthanasia of Animals: 2020 Edition (Guidelines). The American Veterinary Medical Association's (AVMA) response to these comments is found below. We hope that our response addresses the major concerns brought forward by these eight individuals during the 60-day open comment period. Please contact us if additional clarification would be helpful or you have questions regarding our responses.

**Psychological Impacts of End-of-Life Decisions**

One commenter expressed the desire for more information and resources related to the psychological impacts of end-of-life decisions and compassion fatigue. Fortunately, the AVMA has also recognized this need and foreshadowed developing resources during our 2018 Humane Endings Symposium. In 2020 the AVMA initiated a Working Group under the oversight of our Steering Committee on Human Animal Interactions. We welcome an observing representative from the NIH OLAW who may be interested in participating in this Working Group.

**Rapid Chilling of Zebrafish**

One commenter requested a change in the temperature range for rapid chilling of zebrafish (*Danio rerio*) from the current 2-4°C to 0-4°C based on Wallace et al.<sup>1</sup> The Panel on Euthanasia thanks the commenter for bringing this additional publication to the Panel's attention and will consider its content during the next update of the Guidelines.

**Fetal Sentience in Rodents**

Two commenters questioned why data from some other mammalian species were used to conclude that rodent fetuses are unconscious in utero. According to Mellor,<sup>2</sup> the general pattern of neurological development appears to be similar across most mammals, irrespective of when the capacities for sentience and conscious perception first appear in relation to the timing of birth. The Panel on Euthanasia agreed with Mellor and, based on work in other

mammalian species, concluded that rodent fetuses are likely to be unconscious in utero and that hypoxia, thereby, would not evoke a response.

### **Manually-applied Blunt Force Trauma in Suckling Pigs**

Two commenters questioned the description and use of manually applied blunt force trauma to euthanize swine. When performed correctly, manually applied blunt force trauma meets the definition of euthanasia for suckling pigs, because the animal experiences minimal pain and distress and is rendered unconscious, quickly leading to death. The unique anatomical features (arrangement of the bones of the skull) of pigs of this age ensure death is achieved quickly and irreversibly.

One commenter indicated they were confused by language within the Guidelines that states, “individuals should actively seek alternatives” to manually applied blunt force trauma when deciding upon a euthanasia technique for suckling pigs. This statement is not intended to be contradictory to the method’s technical appropriateness as an “acceptable with conditions” euthanasia method. Importantly, “acceptable with conditions” methods are equivalent to acceptable methods when all criteria for application of a method can be met. Individuals performing manually applied blunt force trauma must be well trained and must not become physically fatigued such that performance of the technique is negatively impacted. Further, manually applied blunt force trauma is aesthetically displeasing and potentially distressing to individuals asked to perform the technique. Psychological impacts on individuals performing the euthanasia technique and general societal acceptance are a few of the many variables that must be weighed when deliberating the choice of a euthanasia method.

Finally, there is no increase in regulatory burden, as a facility or individual performing this method of euthanasia should have a standard operating procedure(s) (SOP) in place and training to ensure that this method is appropriately applied. These SOPs should also have descriptions of other methods that could be used to help mitigate the operator error or safety concerns described above.

### **Hypothermia in Reptiles and Amphibians**

Another commenter referenced the possible use of hypothermia or freezing as a method of euthanasia for reptiles and amphibians. The AVMA continues to support the designation of hypothermia or freezing of amphibians and reptiles as unacceptable in animals > 4g in weight. Rapid freezing should **only** be used for amphibians < 4g in weight **and** a secondary method should be used to ensure death has occurred and is irreversible. This method is based on rodent models and likely will work for ectothermic vertebrates that fall within in this weight range. However, the use of hypothermia/freezing as a euthanasia method for these species lacks the appropriate scientific literature support to document that it meets the criteria set forth in the Guidelines for the Euthanasia of Animals 2020 Edition.

One of the arguments posed by the commenter is derived from articles that describe how amphibians have evolved the ability to survive freeze-thaw cycles and thus do not feel pain with the formation of ice crystals in their tissues. The details of this claim are not fully characterized,

and limited peer-reviewed data exist to support it. While it is true that some amphibian species possess the ability to withstand freeze-thaw cycles, it is unclear whether any pain or distress (or consequently, lack thereof) is experienced by these species or others. This evolutionary ability may indicate that these cold tolerant amphibians are not permanently harmed, but it fails to provide evidence that no pain or discomfort is experienced by these species (and they, arguably, would take longer to reach unconsciousness and death). Likewise, to our knowledge, there are no reptilian species that can survive freezing solid without harm as observed in the amphibian species *Lithobates sylvaticus*. Concluding there is lack of pain fails to address how nociception is hampered by hypothermia in amphibians and reptiles, as well as other species. Therefore, applying a method tested in only a few species to such a diverse range of species is inappropriate, as all have evolved their own unique physiologic and anatomical adaptations.

Our current understanding of amphibians' and reptiles' behavioral and physiological responses is incomplete. For this reason, many recommendations for minimizing pain and distress are extrapolated from information available about mammals. Ectothermic vertebrates are not mammals, and the rubrics we use to subjectively and objectively measure pain in mammalian species (and to an extent, avian) cannot always be directly applied to these unique species. Where uncertainty exists, it is best to proactively alleviate potential pain and suffering and utilize current evidence-based methods to ensure the highest level of welfare and to remain consistent with criteria for the acceptable performance of euthanasia. Therefore, if this method is to be considered, more robust data from peer-reviewed journals are needed. Such studies will provide the quantitative and qualitative information needed to determine the utility of hypothermia and/or freezing as a euthanasia method.

### **Thoracic Compression in Avians**

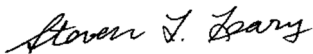
Another common concern described in the comments is the Guidelines approach to the use of thoracic compression as a method of euthanasia for wild avian and mammalian species. Thoracic (also referred to as cardiopulmonary or cardiac) compression is a method that has been used by biologists to terminate the lives of wild birds and small mammals, mainly under field conditions. Although it has been used extensively in the field, data supporting this method are limited, including on the degree of distress induced and time to unconsciousness or death. Given our current knowledge of the physiology of both small mammals and birds, it cannot be assured that thoracic compression does not result in pain and distress before animals become unconscious. Research published by Paul-Murphey et al.,<sup>3</sup> indicates that some birds may die from aortic rupture (exsanguination). The AVMA believes that exsanguination as a sole method of killing should be used only when animals are unconscious due to the anxiety associated with extreme hypovolemia. The information that we do have, combined with what is unknown, places the method of thoracic compression in the "unacceptable" category for conscious animals. Thoracic compression can be used as a secondary kill step for animals that are deeply anesthetized or insentient.

The consensus of the Panel after conversations with veterinarians that have field biology training and expertise is that portable equipment and alternate methods are currently available to field biologists for euthanasia of wildlife under field conditions, in accordance with current

standards for good animal welfare. Anesthetics can be administered prior to application of thoracic compression. Depending on taxa, open-drop methods or injectable agents that do not require DEA registration can be used. These alternate methods are generally practical to use as standard procedures with minimal training and preparation required prior to embarking upon fieldwork.

Thank you for your time and consideration of the AVMA's response to these comments. If you have any further questions or concerns, please feel free to reach out to us.

Sincerely,



Steven Leary, DVM, DAACLAM  
Chair, AVMA Panel on Euthanasia



Janet D. Donlin, DVM, CAE  
Executive Vice President and Chief Executive Officer

*As one of the oldest and largest veterinary medical organizations in the world, with more than 95,000 member veterinarians worldwide engaged in a wide variety of professional activities and dedicated to the art and science of veterinary medicine, the mission of the AVMA is to lead the profession by advocating for its members and advancing the science and practice of veterinary medicine to improve animal health and welfare and public health. The Association has a long-term concern for, and commitment to, the welfare and humane treatment of animals.*

---

<sup>1</sup> Wallace CK, Bright LA, Marx JO, et al. Effectiveness of Rapid Cooling as a Method of Euthanasia for Young Zebrafish (*Danio rerio*). *J Am Assoc Lab Anim Sci*. 2018;57(1):58–63.

<sup>2</sup> Mellor DJ, Diesch TJ, Johnson CB. When do mammalian young become sentient? *ALTEX* 2010;27(suppl 1):281–286.

<sup>3</sup> Paul-Murphy JR, Engilis, A, Pascoe PJ, et al. Comparison of intraosseous pentobarbital administration and thoracic compression for euthanasia of anesthetized sparrows (*Passer domesticus*) and starlings (*Sturnus vulgaris*). *Am J Vet Res* 2017;78(8):887-899.