

January 30, 2025

Panel on Animal Depopulation  
American Veterinary Medical Association  
1931 North Meacham Road, Suite 10  
Schaumburg, IL 60173-4360

**Re: Comments on Draft AVMA Guidelines for the Depopulation of Animals**

Dear Members of the AVMA Depopulation Panel and Working Groups:

As veterinarians and veterinary students who take seriously our profession's duty to lead in matters of animal welfare, we appreciate the invitation to comment on the AVMA's draft *Guidelines for the Depopulation of Animals*.

We recognize and support several improvements in this updated edition, including the addition of higher-welfare, nitrogen-based depopulation methods for poultry and pigs in Tier 1 (preferred methods). These practical, scalable methods, including nitrogen whole-house gassing and high-expansion nitrogen-filled foam, result in rapid loss of consciousness without pain and with little or no distress.<sup>1</sup> We also support the *Guidelines*' emphasis on planning and preparedness,<sup>2</sup> particularly in agricultural settings, where tens of millions of animals are depopulated each year.<sup>3,4,5</sup>

Importantly, however, we urge the AVMA to revise the draft *Guidelines* by reclassifying the following three depopulation methods to Tier 3: (1) ventilation shutdown plus heat and humidity (VSD+) for poultry; (2) water-based foam for pigs and other livestock; and (3) manual blunt force trauma for pigs. Tier 3 is fitting because it includes methods that, due to their negative impacts on animal welfare, should be considered only when higher tier methods cannot be reasonably implemented and doing nothing would likely result in greater suffering.<sup>6</sup>

**I. VSD+**

VSD+ as a depopulation method for poultry must be downgraded from Tier 2 to Tier 3 and, for both poultry and pigs, must be described as "not recommended." As defined by the *Guidelines*, Tier 2 is reserved for methods for which there is "moderate to limited evidence available to demonstrate rapid loss of consciousness," or which "have other constraints that do not support their prioritization to Tier 1."<sup>7</sup> Tier 3 methods, by contrast, are those for which there is "limited to no evidence to support their use," or for which the "evidence may be contrary to good animal welfare."<sup>8</sup> For both pigs and poultry, VSD+ fits squarely within the Tier 3 definition because available evidence indicates it causes severe, prolonged suffering and should, therefore, be used

only as a final recourse.<sup>9,10</sup> Without explanation, however, the draft *Guidelines* classify VSD+ as Tier 3 for use with pigs but Tier 2 for use with poultry. It must be designated as Tier 3 for both.

As described in the *Guidelines*, VSD+ involves killing birds through hyperthermia, or heatstroke, by shutting down the ventilation in a poultry house, sealing it, and injecting heat or heat combined with humidity until temperatures inside the house reach 120–128°F.<sup>11</sup> According to the *Guidelines*, these temperatures are “painful for the birds,”<sup>12</sup> and time to death is prolonged, ranging from 53 minutes in controlled laboratory settings to over 300 minutes under simulated field conditions.<sup>13</sup> Further, even after several hours, VSD+ frequently fails to kill every bird. According to the U.S. Department of Agriculture, 74% of layer hen houses employing VSD+ report survivors, whose subsequent killing via a secondary depopulation may take up to five days.<sup>14</sup> Thus, there is substantial evidence that using VSD+ to depopulate poultry is “contrary to good animal welfare” and it must therefore be designated a Tier 3 method.

## II. Water-Based Foam

Water-based foam as a depopulation method should also be downgraded to Tier 3. It is currently identified as Tier 1 for pigs. According to the *Guidelines*, Tier 1 methods “are supported by multiple sources of evidence suggesting that they result in rapid loss of consciousness and optimize animal welfare outcomes.”<sup>15</sup> However, available evidence indicates that welfare is severely compromised when death occurs via obstruction of the airway.<sup>16,17</sup> The expert Panel on Animal Health and Welfare of the European Food Safety Authority (EFSA) has found that water-based foam should not be used because it is “highly painful” and, as a “method designed to cause occlusion of the trachea,” is “equivalent to death by drowning or suffocation.”<sup>18,19,20</sup> The AVMA’s 2020 *Guidelines for the Euthanasia of Animals* list both asphyxiation and drowning as methods that are “unacceptable as primary methods of euthanasia,” noting specifically that drowning is “inhumane.”<sup>21</sup>

In addition, the United Kingdom’s governmental Animal Welfare Committee states that water-based foam should not be used for killing animals, noting that “[w]elfare concerns arise from this mode of action which is equivalent to drowning or suffocation . . . neither of which are recognised as humane under European legislation nor the 2018 World Organisation for Animal Health guidelines on the killing of animals for disease control purposes.”<sup>22</sup> Further, even precautions such as ensuring the foam level rapidly rises to two times the animal’s head height do not decrease the average time to unconsciousness much below three minutes from the start of foaming<sup>23,24</sup>—a relatively long period for animals to suffer pain, respiratory distress, fear, anxiety, and helplessness. There is thus significant evidence that using water-based foam to depopulate pigs (or other livestock) is “contrary to good animal welfare.” For this reason, and because of the availability of other practical, scalable, higher-welfare methods,<sup>25,26,27</sup> the use of water-based foam should be designated a Tier 3 method.

### III. Manual Blunt Force Trauma

Manual blunt force trauma for pigs should likewise be reassigned from Tier 1 to Tier 3 and described as “not recommended” for killing large numbers of animals. The *Guidelines* recognize that this method is not appropriate for adult pigs<sup>28</sup>; however, even for piglets, this method should be used only as a last resort during depopulation.

Manual blunt force trauma is typically performed “by striking the animal’s head with a hammer” or “swinging the young animal against the floor or a wall.”<sup>29,30</sup> While this method of killing may result in instantaneous loss of consciousness when performed perfectly, it carries a high risk of negative animal welfare outcomes because: (1) a high level of skill is required to perform it properly; (2) it can lead to prolonged and significant pain and distress when performed imperfectly; and (3) operators are highly prone to fatigue.<sup>31,32,33</sup> The AVMA’s *Euthanasia Guidelines* explain that “[f]atigue can lead to inconsistency in application, creating humane concerns about its efficacious application to large numbers of animals.”<sup>34</sup> As a result, “the AVMA encourages those using manually applied blunt force trauma to the head as a euthanasia method to actively search for alternate approaches.”<sup>35</sup>

Research has found that determining consciousness can be difficult when manual blunt force trauma is used as a killing method. Thus, piglets killed by this method often receive repeated blows—even under controlled research conditions.<sup>36</sup> The EFSA notes that, because this method of killing is “prone to error . . . the probability of achieving an immediate and humane killing in all cases is low.”<sup>37</sup> In recognition that incomplete concussion leads to “pain and fear,” the EFSA’s expert animal welfare panel does not recommend manual blunt force trauma as an on-farm killing method.<sup>38</sup> In the European Union, this method is not permitted to be used routinely, but only “where there are no other methods available.”<sup>39</sup>

In addition to its impact on animals, performing manual blunt force trauma on a large number of animals carries unacceptable risks to the psychological well-being of operators.<sup>40</sup> For this reason, under E.U. regulations, no one is permitted to kill more than 70 animals per day by this method.<sup>41</sup> Accordingly, to protect both animal and human welfare, manual blunt force trauma should be designated a Tier 3 method.

Thank you for considering our comments. Please see Appendix 1 for a list of veterinarian and veterinary student signatories.

---

<sup>1</sup> Among dozens of studies supporting this finding, see, e.g., Hill, J. (2024), *Evaluation of nitrogen whole house gassing for the mass depopulation of poultry*. [Webinar]. Poultry Innovation Partnership. <https://poultryinnovationpartnership.ca/presentation/evaluation-for-adopting-nitrogen-in-whole-barn-gassing-during->

- 
- [the-mass-depopulation-of-poultry/](#); United Kingdom Animal Welfare Committee (2024). Opinion on the use of high expansion nitrogen foam delivery systems for depopulation of poultry flocks affected by notifiable disease in the UK. Available at: <https://www.gov.uk/government/publications/awc-opinion-on-high-expansion-nitrogen-foam-for-culling-poultry/awc-opinion-on-the-use-of-high-expansion-nitrogen-foam-for-culling-poultry>; Culhane, M. (2023). Adapting high expansion foam for use in American systems as an alternative method for humane killing [Presentation]; EFSA Panel on Animal Health and Welfare. (2024). The use of high expansion foam for stunning and killing pigs and poultry. *EFSA Journal. European Food Safety Authority*, 22(7), e8855. <https://doi.org/10.2903/j.efsa.2024.8855>.
- <sup>2</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 4648-4649
- <sup>3</sup> USDA. (n.d.). 2022–2023 Highly pathogenic avian influenza outbreak: Summary of depopulation methods and the impact on lateral spread. Available at: <https://www.aphis.usda.gov/sites/default/files/hpai-2022-2023-summary-depop-analysis.pdf>
- <sup>4</sup> Baysinger, A., Senn, M., Gebhardt, J., Rademacher, C., & Parris-Garcia, M. (2021). A case study of ventilation shutdown with the addition of high temperature and humidity for depopulation of pigs. *Journal of the American Veterinary Medical Association*, 259(4), 415–424. <https://doi.org/10.2460/javma.259.4.415>
- <sup>5</sup> Graber, R. (2024). Iowa Pure Prairie Poultry chickens depopulated. *WATTPoultry*. Available at: <https://www.wattagnet.com/broilers-turkeys/broilers/article/15706894/iowa-pure-prairie-poultry-chickens-depopulated>
- <sup>6</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 530-531.
- <sup>7</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 523-533.
- <sup>8</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 530-531.
- <sup>9</sup> Reyes-Illg, G., Martin, J. E., Mani, I., Reynolds, J., & Kipperman, B. (2023). The rise of heatstroke as a method of depopulating pigs and poultry: Implications for the US veterinary profession. *Animals*, 13(1), 140. <https://doi.org/10.3390/ani13010140>
- <sup>10</sup> United Kingdom Department for Environment, Food and Rural Affairs - Animal Welfare Committee. (2023). Advice on emergency culling for the depopulation of poultry affected by high pathogenic avian influenza (HPAI) – consideration of ventilation shutdown (VSD). Available at: <https://www.gov.uk/government/publications/advice-on-emergency-culling-for-the-depopulation-of-poultry-affected-by-high-pathogenic-avian-influenza-hpai>
- <sup>11</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 5336-5358.
- <sup>12</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 5345-5348.
- <sup>13</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 5389-5392.
- <sup>14</sup> APHIS. (n.d.). 2022–2023 Highly pathogenic avian influenza outbreak: Summary of depopulation methods and the impact on lateral spread. Available at: <https://www.aphis.usda.gov/sites/default/files/hpai-2022-2023-summary-depop-analysis.pdf>
- <sup>15</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 515-516.
- <sup>16</sup> Beausoleil, N. J., & Mellor, D. J. (2015). Introducing breathlessness as a significant animal welfare issue. *New Zealand Veterinary Journal*, 63(1), 44–51. <https://doi.org/10.1080/00480169.2014.940410>
- <sup>17</sup> Ludders, J. W., Schmidt, R. H., Dein, F. J., & Klein, P. N. (1999). Drowning Is not euthanasia. *Wildlife Society Bulletin*, 27(3), 666–670.
- <sup>18</sup> EFSA Panel on Animal Health and Welfare (2020). Welfare of pigs during killing for purposes other than slaughter. *EFSA Journal. European Food Safety Authority*, 18(7), e06195. <https://doi.org/10.2903/j.efsa.2020.6195>
- <sup>19</sup> EFSA Panel on Animal Health and Welfare. (2019). Killing for purposes other than slaughter: poultry. *EFSA Journal. European Food Safety Authority*, 17(11), e05850. <https://doi.org/10.2903/j.efsa.2019.5850>
- <sup>20</sup> EFSA Panel on Animal Health and Welfare. (2024). The use of high expansion foam for stunning and killing pigs and poultry. *EFSA Journal. European Food Safety Authority*, 22(7), e8855. <https://doi.org/10.2903/j.efsa.2024.8855>.
- <sup>21</sup> AVMA. (2020). *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*. Page 112.
- <sup>22</sup> United Kingdom Animal Welfare Committee (2024). Opinion on the use of high expansion nitrogen foam delivery systems for depopulation of poultry flocks affected by notifiable disease in the UK. Available at: <https://www.gov.uk/government/publications/awc-opinion-on-high-expansion-nitrogen-foam-for-culling-poultry/awc-opinion-on-the-use-of-high-expansion-nitrogen-foam-for-culling-poultry>
- <sup>23</sup> Campler, M. R., Cheng, T.-Y., Arruda, A. G., Flint, M., Kieffer, J. D., Youngblood, B., & Bowman, A. S. (2023). Refinement of water-based foam depopulation procedures for finisher pigs during field conditions: Welfare implications and logistical aspects. *Preventive Veterinary Medicine*, 217, 105974. <https://doi.org/10.1016/j.prevetmed.2023.105974>
- <sup>24</sup> Korenyi-Both, J., Vidaurre, J., Held, T., Campler, M. R., Kieffer, J., Cheng, T. Y., Moeller, S. J., Bowman, A. S., & Arruda, A. G. (2022). Description of electroencephalographic data gathered using water-based medium-expansion

---

foam as a depopulation method for nursery pigs. *Scientific Reports*, 12(1), 16798. <https://doi.org/10.1038/s41598-022-21353-7>

<sup>25</sup> Bergen, G. (2023). Design, operation and lessons learned of a nitrogen gas-based swine depopulation system (presentation). AVMA Humane Endings Symposium, Chicago, IL, Jan 26-29, 2023.

<sup>26</sup> Williams, T. (2022, March 30). Validation and demonstration of utilizing high expansion nitrogen foam for large scale depopulation of swine, NPB Project #21-069. Available at: <https://porkcheckoff.org/wp-content/uploads/2022/06/21-069-WILLIAMS-final-rpt.pdf>

<sup>27</sup> Mote, B.; Woiwode, R. (2020). Validation of a mobile electrocution system for humane mass depopulation of swine – NPB #20-123. Pork Checkoff Research <https://porkcheckoff.org/wp-content/uploads/2021/02/20-123-MOTE-final-rpt.pdf>.

<sup>28</sup> Draft *AVMA Guidelines for the Depopulation of Animals*, lines 3730-3734.

<sup>29</sup> Dalla Costa, F. A., Gibson, T. J., Oliveira, S. E. O., Gregory, N. G., Coldebella, A., Faucitano, L., Ludtke, C. B., Buss, L. P., & Dalla Costa, O. A. (2020). Evaluation of physical euthanasia for neonatal piglets on-farm. *Journal of Animal Science*, 98(7), skaa204. <https://doi.org/10.1093/jas/skaa204>

<sup>30</sup> Grist, A., Lines, J. A., Knowles, T. G., Mason, C. W., & Wotton, S. B. (2018). The Use of a Non-Penetrating Captive Bolt for the Euthanasia of Neonate Piglets. *Animals: an open access journal from MDPI*, 8(4), 48. <https://doi.org/10.3390/ani8040048>

<sup>31</sup> Velarde, A. & Dalmau, A. (2018). Chapter 10 - Slaughter of pigs. In M. Špinko (Ed.) *Advances in Pig Welfare*. Woodhead Publishing, pp. 295-322. <https://doi.org/10.1016/B978-0-08-101012-9.00010-1>

<sup>32</sup> Dalla Costa, F. A., Gibson, T. J., Oliveira, S. E. O., Gregory, N. G., Coldebella, A., Faucitano, L., Ludtke, C. B., Buss, L. P., & Dalla Costa, O. A. (2020). Evaluation of physical euthanasia for neonatal piglets on-farm. *Journal of Animal Science*, 98(7), skaa204. <https://doi.org/10.1093/jas/skaa204>

<sup>33</sup> Anderson, K. N., Deen, J., Karczewski, J., Zhitnitskiy, P. E., & Vogel, K. D. (2022). History and best practices of captive bolt euthanasia for swine. *Translational Animal Science*, 6(2), txac065. <https://doi.org/10.1093/tas/txac065>

<sup>34</sup> AVMA. (2020). *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*. <https://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf>. Page 42.

<sup>35</sup> AVMA. (2020). *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*. <https://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf>. Page 42.

<sup>36</sup> Whiting, T. L., Steele, G. G., Wamnes, S., & Green, C. (2011). Evaluation of methods of rapid mass killing of segregated early weaned piglets. *The Canadian Veterinary Journal = La Revue Veterinaire Canadienne*, 52(7), 753–758.

<sup>37</sup> EFSA Panel on Animal Health and Welfare. (2020). Welfare of pigs during killing for purposes other than slaughter. *EFSA Journal. European Food Safety Authority*, 18(7), e06195. <https://doi.org/10.2903/j.efsa.2020.6195>

<sup>38</sup> EFSA Panel on Animal Health and Welfare. (2020). Welfare of pigs during killing for purposes other than slaughter. *EFSA Journal. European Food Safety Authority*, 18(7), e06195. <https://doi.org/10.2903/j.efsa.2020.6195>

<sup>39</sup> Council Directive 1099/2009. 2009. Council Regulation No. 1099/2009 on the protection of animals at the time of killing. *Off. J. Eur. Union* **L303**:1–30.

<sup>40</sup> Dalla Costa, F. A., Gibson, T. J., Oliveira, S. E. O., Gregory, N. G., Coldebella, A., Faucitano, L., & Dalla Costa, O. A. (2019). On-farm pig dispatch methods and stockpeople attitudes on their use. *Livestock Science*, 221, 1–5. <https://doi.org/10.1016/j.livsci.2019.01.007>

<sup>41</sup> Council Directive 1099/2009. 2009. Council Regulation No. 1099/2009 on the protection of animals at the time of killing. *Off. J. Eur. Union* **L303**:1–30.