Pain Management Chart

The following chart offers suggestions on pain management methods for procedures requiring pain management under the Certified Humane® program, as all animals with central nervous systems experience pain, which is not always directly observable.

This document is meant to serve as guidelines for worldwide producers and their veterinarians. Therefore, suggestions may not reflect what is available in every area.

Prior to using methods referenced below, producers in conjunction with a veterinarian must develop a pain management plan as part of their Animal Health Plan.

*See references below for supporting scientific literature.

	Castration	Dehorning/Disbudding	Supernumerary teat removal
Cattle	Oral meloxicam (crushed tablets cost a few cents, can administer orally with molasses); Flunixin meglumine (Banamine®) injection; Local anesthesia	Local lidocaine (lignocaine); Local anesthesia (bupivacaine) combined with anti-inflammatory drugs (ketoprofen); Cauterizing the wound under local anesthetic; Oral meloxicam; Other NSAIDs After 4 weeks of age: local corneal nerve block and systemic analgesia combined	Local anesthetic injection
Goats	Analgesics and local anesthesia combined	Anesthesia (e.g. TriSolfen®)	
Sheep	Topical anesthetic with lidocaine (lignocaine) and bupivacaine; Analgesics and local anesthesia combined	Anesthesia (e.g. TriSolfen®)	
Pigs	Local anesthesia only; Topical combination of local anesthetic and antiseptic; Anesthetics combined with analgesics		

*Scientific Research Supporting Pain Management

Cattle

- **"All castration methods [in cattle] have been demonstrated to produce physiologic, neuroendocrine, and behavioral changes indicating pain and distress."** Coetzee, Johann F. "Assessment and Management of Pain Associated with Castration in Cattle." *Vet Clinic Food Animal.* Elsevier. 2013.
- **"Standard husbandry procedures" including tail docking, castration, mulesing, and ear tagging or marking cause pain in ruminant animals. The pain caused by these procedures can manifest physiologically, biochemically, immunologically, and behaviorally."** Egger, Christine M.; Love, Lydia; Doherty, Tom. "Pain Management in Veterinary Practice." *Wiley Blackwell*. 2014.
- **"Dehorning causes behavioral, physiologic, and neuroendocrine changes, indicating a stressful or painful response in cattle. Following dehorning, an acute painful response is observed within the first 30 minutes followed by a period of suggested inflammatory pain lasting up to 8 hours."** Stock, Matthew L.; Baldridge, Sarah L.; Griffin, Dee; Coetzee, Johann F. "Bovine Dehorning: Assessing Pain and Providing Analgesic Management." *Vet Clinic Food Animal.* Elsevier. 2013.
- **"Extensive research has shown that dehorning stimulates both an acute pain response and a delayed inflammatory reaction," which are "measured through physiological, behavioural, and pain sensitivity responses."** Duffield, T. "Current data on dehorning calves." *Proceedings of the 41st Annual Conference of the American Association of Bovine Practitioners, Charlotte, North Carolina, USA.* (25-28). 2008.
- **"Dehorning is a painful experience."** Canozzi, M. E. A.; Mederos, A.; Turner, S.; Manteca, X.; McManus, C.; Menegassi, S. R. O.; Barcellos, J. O. J. "Dehorning and welfare indicators in beef cattle: a meta-analysis." *Animal Production Science 2019 Vol. 59 No. 5 (801-814).* 2019.
- **"Surgical castration using knife-cutting causes more discomfort after castration than burdizzo castration or not castrating at all in 1-week-old calves, 2-month-old calves, and 4-month-old calves. This discomfort is exhibited physiologically and behaviorally."** Meléndez, D. M.; Marti, S.; Pajor, E. A.; Moya, D.; Heuston, C. E. M.; Gellatly, D.; Janzen, E. D.; Schwartzkopf-Genswein, K. S. "Effect of band and knife castration of beef calves on welfare indicators of pain at three relevant industry ages: I. Acute pain." *American Society of Animal Science*. Journal of Animal Science. 2017. DOI: 10.2527/jas2017/1762.
- **"Knife castrated calves exhibited a greater acute pain response than band castrated calves."** Meléndez, D. M.; Marti, S.; Pajor, E. A.; Moya, D.; Gellatly, D.; Janzen, E. D.; Schwartzkopf-Genswein, K. S. "Effect of a single dose of meloxicam prior to band or knife castration in 1-wk-old beef calves: I. Acute pain." *Journal of Animal Science 2018 Vol. 96 No. 4 (1268-1280).* 2018.
- **"Calves that are knife-castrated and branded at the same time showed more physiological and behavioral indicateors of acute pain then solely-knife-castrated calves, "suggesting that the combination of knife castration+branding was more painful."** Meléndez, D. M.; Marti, S.; Pajor, E. A.; Moya, D.; Gellatly, D.; Janzen, E. D.; Schwartzkopf-Genswein, K. S. "Effect of subcutaneous meloxicam on indicators of acute pain and distress after castration and branding in 2-mo-old beef calves." *Journal of Animal Science 2018 Vol. 96 No. 9 (3606-3621).* 2018.
- **"Castration and dehorning can cause pain. Teat surgery also requires pain management."** Anderson, David E.; Edmondson, Misty A. "Prevention and Management of Surgical Pain in Cattle." *Vet Clinic Food Animal.* Elsevier. 2013.

Pigs

- **"Surgical castration is indeed painful."** Yuh, Jinhyeon; Ollila, Anna; Valros, Anna; Larenza-Menzies, Paula; Neinonen, Mari; Oliviero, Claudio; Peltoniemi, Olli. "Behavioural alterations in piglets after surgical castration: Effects of analgesia and anaesthesia." *Research in Veterinary Science 125 (2019) (36-42)*.
- **"Castration is a painful intervention for piglets."** Courboulay, V.; Hemonic, A.; Prunier, A. "Assessing the different methods of pain management during castration." *Journées de la Recherche Porcine en France 2018 Vol.50. (305-310).* 2018.
- **"Evidence shows that castration is painful and has a detrimental influence on pig health…Surgical castration has a negative impact on production in the suckling period because it causes an increase in pre-weaning mortality…and negatively affects the body weight at weaning in pigs."** Morales, Joaquin; Dereu, Andre; Manso, Alberto; de Frutos, Laura; Piñiero, Carlos; Manzanilla, Edgar G.; Wuyts, Niels. "Surgical castration with pain relief affects the health and productive performance of pigs in the suckling period." *Porcine Health Management.* 2017.
- **"Piglet castration results in acute pain and stress to the animal."** Sheil, M. L.; Chambers, M.; Sharpe, B. "Topical wound anaesthesia: efficacy to mitigate piglet castration pain." *Australian Veterinary Journal: Production Animals*. 2020. DOI: 10.1111/avj.12930.

Goats and Sheep

- **"Castration and tail docking change the behaviors and biochemicals that indicate pain in sheep. These behaviors include active pain avoidance behaviors, abnormal postures, and lesion scores. Biochemical indicators include plasma cortisol changes."** Fitzpatrick, J.; Scott, M.; Nolan, A. "Assessment of pain and welfare in sheep." *Small Ruminant Research 62 (2006). 55-61*. 2005.
- **"Small ruminants experience pain after "noxious stimuli," including management procedures such as tail docking or castration."** Plummer, Paul J.; Schleining, Jennifer A. "Assessment and Management of Pain in Small Ruminants and Camelids." *Vet Clinic Food Animal. (185-208)*. 2013. DOI: 10.1016/j.cvfa.2012.11.004.
- **"Pain is caused by procedures in lambs and kids. Painful procedures include surgical castration, tail docking, disbudding, ear-tagging, and shearing wounds."** Windsor, P. A.; Lomas, S.; White, P. "Progress in pain management to improve small ruminant farm welfare." *Small Ruminant Research*. Elsevier 2016. DOI: 10.1016/j.smallrumres.2016.03.024.