

AVMA Guidelines for Placement of Gun Shot and Captive Bolt in Ruminant for Euthanasia

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Species Covered

Cattle

Sheep

Goats

Alpacas

Water buffalo

Buffalo

AVMA Guidelines for Euthanasia of Cattle Gun Shot

Considerations:

- Handgun vs rifle vs shotgun
- Adult cow vs calf vs bull
- Bullet
- Location

AVMA Guidelines for Euthanasia of Cattle Gun Shot

Handguns

- 1-2 feet from animal
- Caliber .32 to .45
- Do not use .22 handgun
 - < 300-foot lbs. at muzzle

Rifle

- Longer distance from animal (ideal 1-3 feet from animal)
- Rifle selection
 - .223, 243, 270, .308
 - .22 Rifle
 - .22 magnum bullet will achieve > 300 foot lbs. at muzzle

AVMA Guidelines for Euthanasia of Cattle

Gun Shot

Shotgun

- 20 gauge, 16 gauge, or 12 gauge
- 1-2 yards from animal

Pro

- Enters skull as mass then disperse for massive destruction
- Not likely to exit body/ skull

Con

- Public perception
- Lead in carcass
 - Possible contamination in rendering

AVMA Guidelines for Euthanasia of Cattle

Placement of Gunshot and Captive Bolt

Landmarks:

- Lateral canthus of the eye to the base of the horn on the opposite side

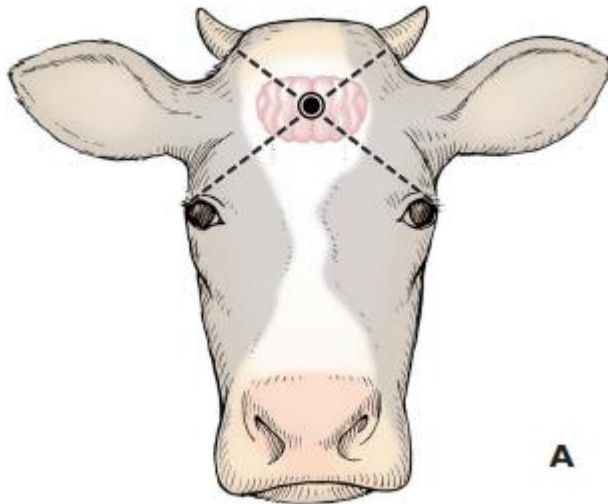


Figure 11—Anatomic site for gunshot or placement of a captive bolt and desired path of the projectile in cattle. The point of entry of the projectile should be at the intersection of 2 imaginary lines, each drawn from the outside corner of the eye to the center of the base of the opposite horn (A). Alternatively in long-faced cattle or young stock (B), a point on the midline of the face that is halfway between the top of the poll and an imaginary line connecting the outside corners of the eyes can be used (AVMA Guidelines for the Humane Slaughter of Animals: 2016 Edition).

AVMA Guidelines for Euthanasia of Cattle

Placement of Gunshot and Captive Bolt

Landmarks:

- Lateral canthus and pole- midline center

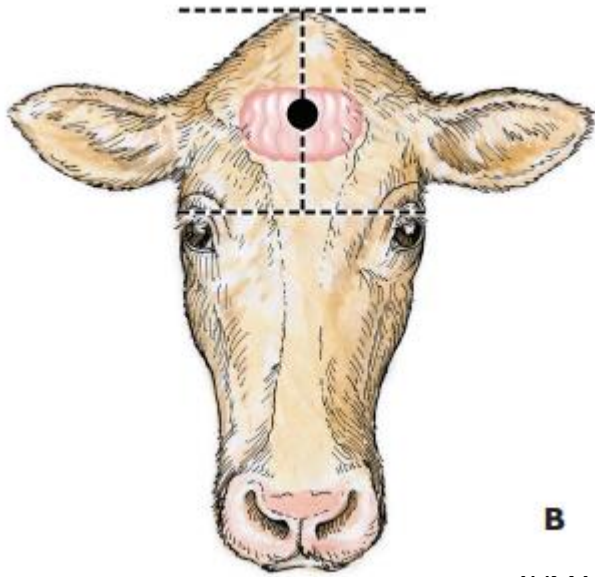


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B

AVMA Guidelines for the Euthanasia of Animals: 2020 Edition

<https://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf>

AVMA Guidelines for Euthanasia of Cattle Bulls and Calves

Age and size does affect the method for euthanasia

- Bulls will need a larger caliber gun
 - Do not use .22
- Calves can be euthanized with a non penetrating captive bolt
 - Requires a 2nd euthanasia method.

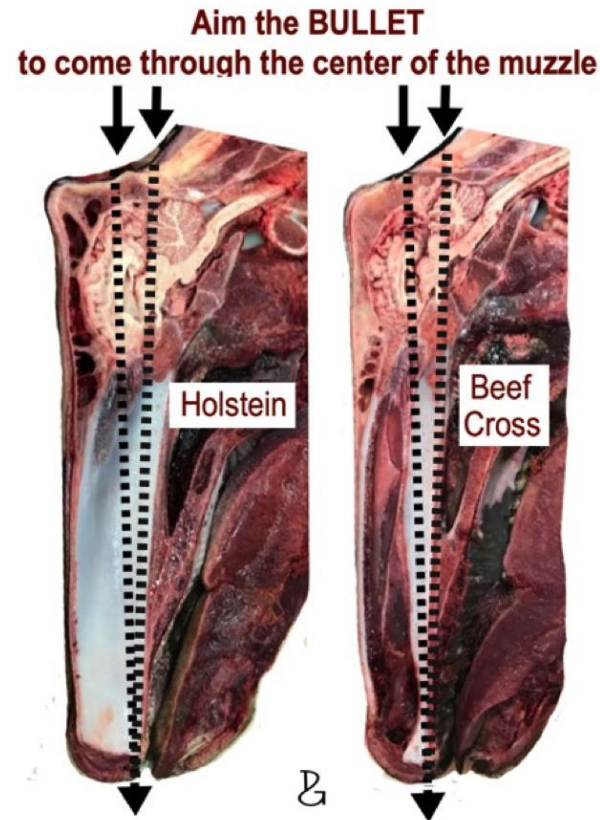
Other Euthanasia methods

Poll shot

Gun shot or Captive bolt penetration from behind the pole in line with the muzzle.

Not currently recommended by AVMA

- Primary or secondary methods
- Neither Gun or Captive bolt
 - Lack of Depth in captive bolt
 - Proper placement of bullet



AVMA Guidelines for Sheep and Goats

Gunshot

- 22 LR rifle
- .38 special
- .357
- 9 mm
- Shotguns

Penetrating Captive Bolt Gun (PCB)

- Requires 2nd method of Euthanasia

AVMA Guidelines for Sheep and Goats

Two Locations

1. Intersection of diagonal lines drawn from the LATERAL canthus to the middle of the opposite ear base
 - Acceptable for both gunshots and penetrating captive bolt
2. Frontal shot while aiming toward the foramen magnum
 - Preferred for big horn animals
 - Only for gunshots method

AVMA Guidelines for Sheep and Goats

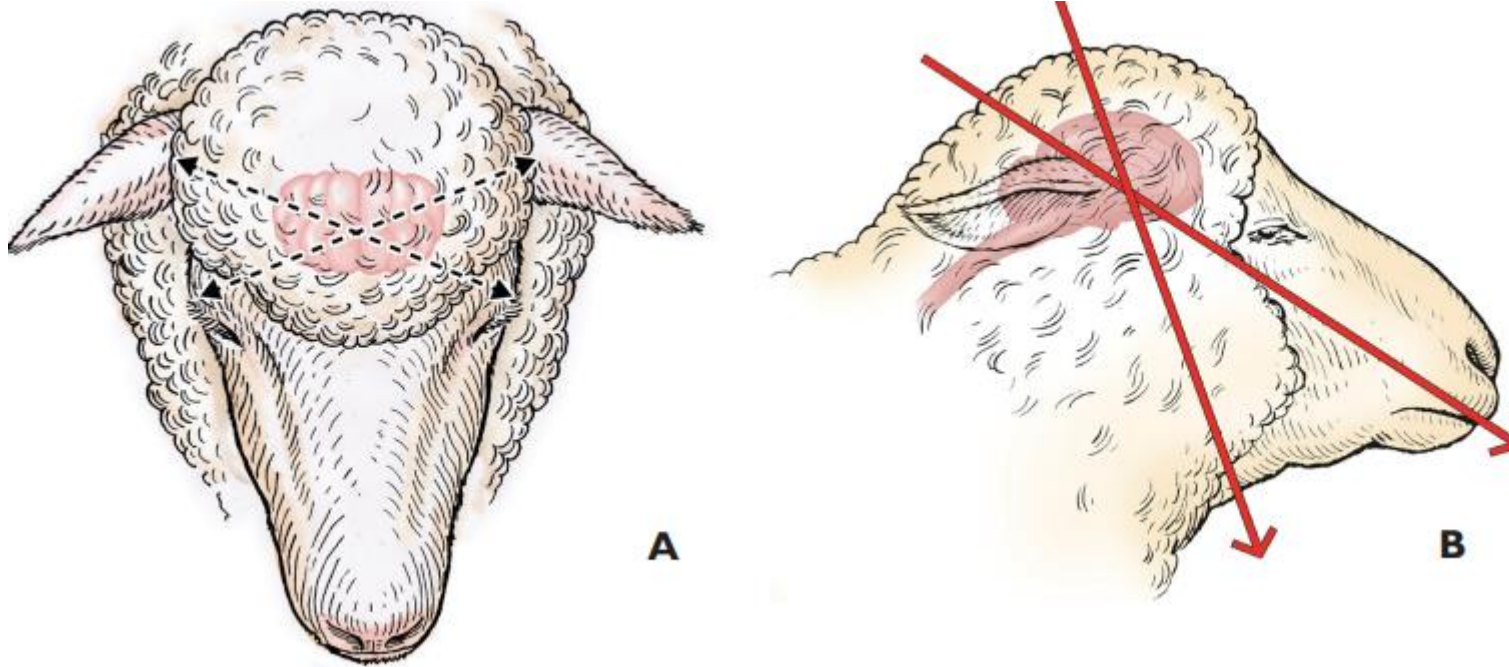


Figure 14—For polled sheep or goats (A), place the PCB perpendicular to the skull over the anatomic site identified as slightly caudal to the poll (the crown or the highest point on the head) at the intersection of 2 lines drawn from the outside corner of each eye to the middle of the base of the opposite ear. Alternatively, a site located on the dorsal midline of the head, which corresponds with the external occipital protuberance of the skull, may be used. When using the site associated with the external occipital protuberance, place the PCB flush with the skull at the external occipital protuberance while angling or aiming the muzzle of the PCB toward the mouth. Panel B indicates direction. (Based on observations in goats by Collins SL, Caldwell M, Hecht S, et al. Comparison of penetrating and nonpenetrating captive bolt methods in horned goats. *Am J Vet Res* 2017;78:151–157; and by Plummer PJ, Shearer JK, Kleinhenz KE, et al. Determination of anatomic landmarks for optimal placement in captive-bolt euthanasia of goats. *Am J Vet Res* 2018;79:276–281.)

AVMA Guidelines for Sheep and Goats

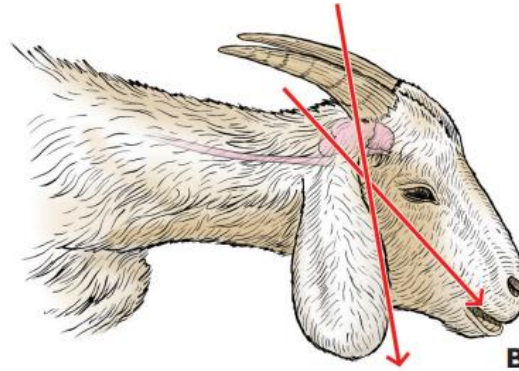
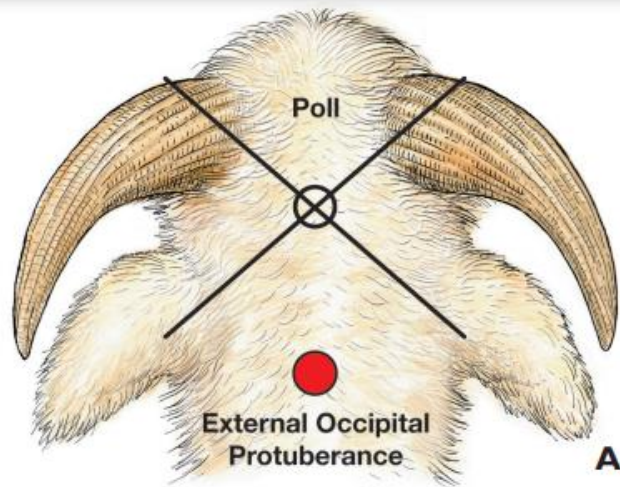


Figure 15—For horned sheep or goats (A), place the PCB perpendicular to the skull over the anatomic site identified as slightly caudal to the poll (also known as the crown or the highest point on the head) at the intersection of 2 lines drawn from the outside corner of each eye to the middle of the base of the opposite ear. (Plummer PJ, Shearer JK, Kleinhenz KE, et al. Determination of anatomic landmarks for optimal placement in captive-bolt euthanasia of goats. *Am J Vet Res* 2018;79:276–281.) Alternatively, a site located on the dorsal midline of the head, which corresponds with the external occipital protuberance of the skull, may be used. When using the site associated with the external occipital protuberance, place the PCB flush with the skull at the external occipital protuberance while angling or aiming the muzzle of the PCB toward the mouth. (Collins SL, Caldwell M, Hecht S, et al. Comparison of penetrating and nonpenetrating captive bolt methods in horned goats. *Am J Vet Res* 2017;78:151–157.) Panel B indicates direction.

AVMA Guidelines for Sheep and Goats

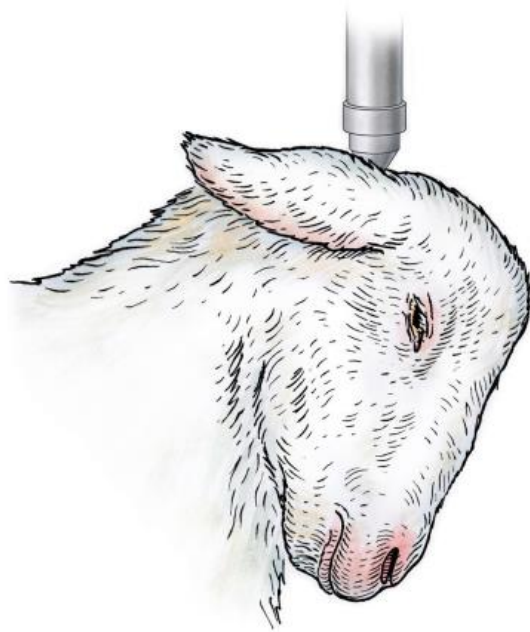


Figure 18—Anatomic site for placement of a captive bolt in neonatal lambs and kids. The preferred shooting position is with the muzzle of the NPCB on the midline behind the poll (ie, between the ears) with the chin tucked into the neck. (Grist A, Lines JA, Knowles TG, et al. The use of a mechanical non-penetrating captive bolt device for the euthanasia of neonate lambs. *Animals (Basel)* 2018;8:49. Sutherland MA, Watson TJ, Johnson CB, et al. Evaluation of the efficacy of a non-penetrating captive bolt to euthanase neonatal goats up to 48 hours of age. *Anim Welf* 2016;25:471–479. Grist A, Lines JA, Knowles TG, et al. Use of a non-penetrating captive bolt for euthanasia of neonate goats. *Animals (Basel)* 2018;8:58.)

AVMA Guidelines for Alpacas and Llamas

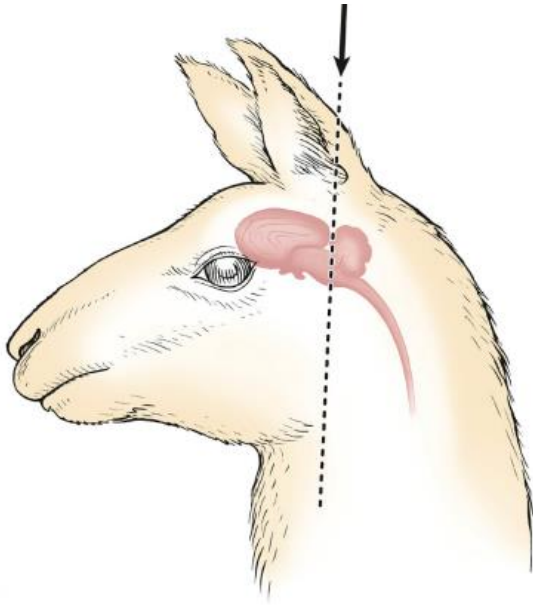


Figure 16—Anatomic site for placement of a captive bolt and desired path of the projectile in camelids. The device should be placed at the crown position (highest point on the head) aiming downward to the base of the jaw.

Pole shot preferred

- Movement of head with frontal shot

Same calibers as goats and sheep

AVMA Guidelines for Water Buffalo

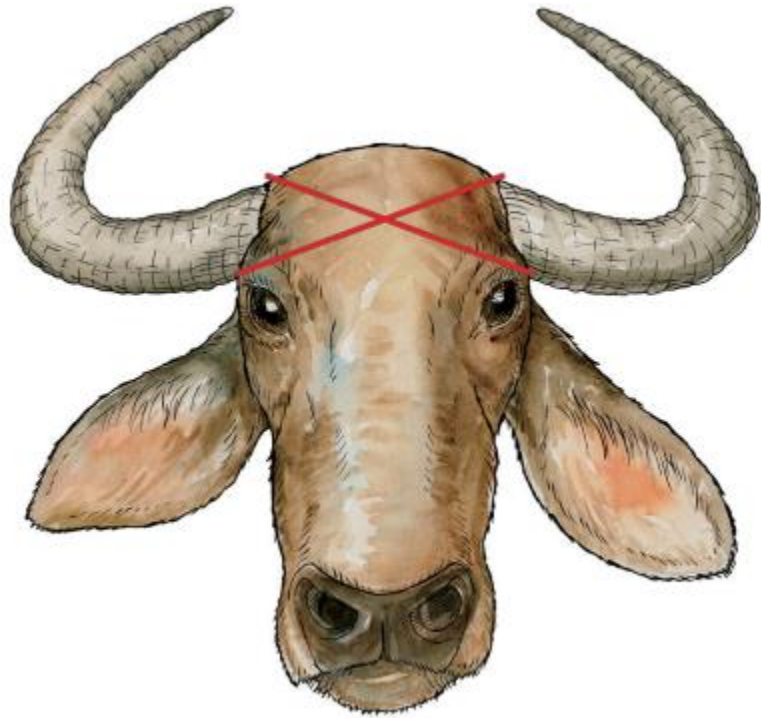


Figure 13—For water buffalo, the preferred anatomic site for gunshot or placement of a captive bolt is the intersection of 2 imaginary lines, each drawn from the lower edge of the horn to the upper edge of the opposite horn.

Rifle only

- 1000 foot-lbs of muzzle force necessary
- Calibers
 - 30-30
 - 270
 - 30-06
- Solid bullets
- 40% longer distance between frontal skin and thalamus

AVMA Guidelines for American Buffalo



Figure 12—Similar to cattle, for American bison, the preferred site for gunshot euthanasia is on the forehead approximately 2.5 cm (1 inch) above an imaginary line connecting the bottom of the horns. The angle of entry should be perpendicular to the skull.

Rifle only

- 1000 foot-lbs of muzzle force necessary
- Calibers
 - 30-30
 - 270
 - 30-06
- Solid bullets

Take Home Points

Use the proper technique for the animal

Be safe