



## **Opinion on the welfare of goats at the time of killing**

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## Animal Welfare Committee (AWC) Opinions

AWC Opinions are short reports to government<sup>1</sup> on contemporary topics relating to animal welfare. They are based on evidence and consultation with interested parties. They highlight particular concerns and indicate issues for further consideration by governments and others.

AWC is an expert committee of the Department for Environment, Food and Rural Affairs (Defra) in England, the Scottish and Welsh Governments and the Northern Ireland Assembly. More information about the Committee is available at [www.gov.uk/government/groups/animal-welfare-committee-awc](http://www.gov.uk/government/groups/animal-welfare-committee-awc)

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<sup>1</sup> Where we refer to “government” we are addressing the Department for Environment, Food and Rural Affairs in England, the Scottish and Welsh Governments, the Northern Ireland Assembly and other responsible Government Departments and Agencies.

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## Scope

1. The scope of this review includes the slaughter and killing of goats within the meat and dairy goat industries, smallholders and private keepers of goats as pets as well as goats kept for their hair. Topics of interest include stunned and non-stun slaughter, culling of unwanted male kids, culling of animals at the end of their productive lives and other end-of-life choices. We will address killing on-farm; fitness to travel; unloading, lairaging, handling and restraint at the slaughterhouse; methods of stunning and killing; volumes of production and destination of production to cover all UK regions.

2. The aim of this Opinion is to provide a detailed review of the animal welfare implications resulting from the various circumstances in which goats are killed and the methods used to kill. Objectives of this review include:

- To investigate the landscape of the goat industry and how this affects the decisions and practices involved in when, where and how goats are killed;
- Reviewing slaughterhouse processes and practices and the main methods used for stunning and killing goats of different age groups at the slaughterhouse;
- Reviewing killing processes and practices applied on-farm or where animals are not sent to slaughter;
- Assessing the animal welfare issues relating to the killing of goats; and
- Making recommendations to improve the welfare of goats at the time of killing.

3. On-farm killing methods for goats, particularly neonates, were covered in a recent FAWC study on the welfare of animals killed on-farm<sup>2</sup>. We may reiterate in this opinion key issues relating to methods, decision making and competency where most relevant and add any further comments to address issues that have arisen during this review.

## Background

4. Recent rapid expansion in the dairy goat industry and limited information about the goat meat industry brings into question how and where goats are killed at the end of their productive life. Numbers of goats in the UK are low in comparison to other livestock species, and there are consequentially few reports of goat welfare issues in slaughterhouses. But goats do have particular physiological and behavioural traits that make a study of their welfare at the time of killing relevant. There is also a lack of information about the numbers of goats killed on the premises where they were kept or elsewhere than in slaughterhouses. Defra, Scottish and Welsh Government and the Department for Agriculture, Environment and Rural Affairs (DAERA) NI have requested this review to inform policy in this area.

5. FAWC previously stated its commitment to the principle that all farmed animals should have a life worth living and that a growing number should have a

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<sup>2</sup> Farm Animal Welfare Committee, [FAWC opinion on the welfare of animals killed on-farm](#), 2018

'good life' (FAWC, 2009<sup>3</sup>). This includes the events leading up to and the manner of their death.

6. AWC remains committed to the principle that prior to killing, whether on-farm or elsewhere, any farmed animal must either be rendered unconscious and insensible to pain instantaneously, or unconsciousness must be induced without pain or distress and that no animal should recover consciousness before death ensues.

7. During the preparation of this Opinion the remit of the Farm Animal Welfare Committee (FAWC) has been expanded to provide expert and detailed advice on companion animals, wild animals kept by people as well as farmed animals. The committee was renamed [the Animal Welfare Committee \(AWC\)](#) from 1 October 2019. AWC will continue in its role as an expert committee advising Defra and the Scottish and Welsh Governments. The Welfare at Killing committee is a sub-group of the AWC that meets the requirement of Article 20 of Council Regulation (EC) No. 1099/2009 on the protection of animals at the time of killing for a source of scientific support for all the UK territories. The role of the Welfare at Killing committee remains unchanged.

## **Evidence**

8. In preparing this opinion, AWC has considered published scientific literature, industry information, published data and assurance information, European Food Safety Authority (EFSA) Opinions, Humane Slaughter Association publications, expert opinions and other information on this issue as well as previous FAWC advice. AWC has carried out a written call for evidence and met with representative bodies from the goat industry. AWC members were unable to visit an operating slaughterhouse to see the slaughter of goats because of the outbreak of Coronavirus in early 2020 but did visit a goat farm prior to this to see production practices and discuss culling policies. The decision has been taken to submit this Opinion to governments in the UK, but the committee will aim to visit a goat slaughterhouse when circumstances allow and may add to this advice with further observations and recommendations. The published report will be circulated to interested parties, including those who gave evidence and assistance.

## **Regulations for the welfare of goats at the time of killing**

9. The rules on identification and movement reporting of sheep also extend to goats (Council Regulation (EC) No. 21/2004 establishing a system for the identification and registration of ovine and caprine animals and the Sheep and Goats Registration, Identification and Movement (England) Order 2009 (SAGRIMO) (and similar legislation in Scotland, Wales and Northern Ireland)). This means the regime of tagging and movement notification for goats is similar to sheep, except that goat tags do not have to contain electronic recognisable identifiers.

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<sup>3</sup> Farm Animal Welfare Council. FAWC Report on Farm Animal Welfare in Great Britain: Past, Present and Future, 2009

10. All goats, commercial or companion, are categorised as livestock and any place where they are kept must be registered as an agricultural holding. Identification tagging and reporting movements under SAGRIMO must be undertaken. Movements of goats must not take place unless the holdings the animals are moved both to and from have been registered for the keeping of livestock. This needs to be better understood and adhered to in the goat keeping community to ensure that data collected on goat populations is accurate and so that management of animal diseases improves.

11. The Welfare of Animals at the Time of Killing (England) Regulations 2015 (WATOK) implement and enforce Council Regulation (EC) No. 1099/2009 on the protection of animals at the time of killing as well as maintaining those national rules that provide greater animal welfare protection than Regulation 1099/2009<sup>4</sup>. Scottish, Welsh and Northern Irish Governments brought in similar legislation: The Welfare of Animals at the Time of Killing (Scotland) Regulations 2013; The Welfare of Animals at the Time of Killing (Wales) Regulations 2014; and The Welfare of Animals at the Time of Killing (Northern Ireland) Regulations 2014.

12. The requirements of Regulation 1099/2009 and WATOK apply to the unloading, lairaging, handling, restraint, stunning and killing of animals in slaughterhouses. All animals must be stunned before slaughter but there is a derogation for non-stun slaughter by methods prescribed by religious rites, provided that slaughter takes place in a slaughterhouse, ruminants are individually and mechanically restrained and that both carotid arteries or the vessels from which they arise are cut.

13. There are several permitted stunning methods available for the slaughter and killing of goats. Simple stun methods include penetrative captive bolt, non-penetrative captive bolt (for ruminants less than 10kg), head-only electrical stunning and head-to-body electrical stunning. These methods must be followed by a killing method, which in a slaughterhouse is normally by severing both the carotid arteries to achieve bleed out. Minimum current for head-only and head-to-body electrical stunning of goats is 1.00 Ampere. Use of a firearm with free projectile is a method that achieves stunning and killing but is not recommended in an enclosed space due to the risks to operatives from the bullet exiting the skull and ricocheting off solid surfaces.

14. A lethal injection as a killing method may be administered by a veterinary surgeon and only when a goat is not destined for human or animal consumption. Requirements for disposal of these animals were included in the FAWC Opinion on the welfare of animals killed on farm<sup>5</sup>.

15. Anyone handling or stunning/killing goats in a slaughterhouse is required to hold a certificate of competence valid for the activities that they are responsible for. These are issued by the Food Standards Agency (FSA) in England and Wales, Food Standards Scotland (FSS) and DAERA in Northern Ireland.

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<sup>4</sup> <https://www.gov.uk/government/collections/welfare-of-animals-at-the-time-of-killing>

<sup>5</sup> Farm Animal Welfare Committee, [FAWC opinion on the welfare of animals killed on-farm](#), 2018

16. Operatives must undertake approved training modules to obtain certificates of competence (CoCs) for handling and slaughter operations related to the different species. However, sheep and goats are combined into a single module for each handling or slaughter operation (Group B - [http://www.fdg.org.uk/our-qualifications/technical/welfare-of-animals-\(watok\)/](http://www.fdg.org.uk/our-qualifications/technical/welfare-of-animals-(watok)/)). These species have recognised differences, so training should specifically include handling and killing of goats if they are going to be included on the slaughterer's CoC. It is recognised that the assessment of competence in operations relating to goat slaughter might be difficult to arrange because the frequency and timing of slaughter is irregular and batch sizes are often limited to small numbers. Providing separate modules in the future would not remove the CoC for operations involving sheep and goats from those already holding them. The risk to goat welfare of operatives obtaining a CoC without having been able to demonstrate competency in the handling and slaughter of goats needs to be recognised. The Official Veterinarian (OV) of the FSA based at the slaughterhouse is responsible for monitoring welfare at slaughter and is required to report if the welfare of a goat is compromised during handling and slaughter operations. Slaughterers and animal handlers can be recommended for retraining where required and their CoC suspended until this is completed.

17. Regulation 1099/2009 and WATOK also contain requirements for the slaughter or killing operations of farmed animals and birds other than in slaughterhouses. A WATOK licence for killing and related operations carried out outside a slaughterhouse is required by anyone killing a goat in a place other than a slaughterhouse in England and Wales. They could alternatively hold a CoC for the same operations issued for use in a slaughterhouse<sup>6</sup>. The Animal and Plant Health Agency (APHA) undertake assessments of operatives for WATOK licences and the licence is issued by the FSA. A WATOK licence or CoC is not required if the animal is being killed under emergency killing procedures or in circumstances exempted from licensing requirements (WATOK (England) 2015, Part 2, Chapter 2 (14)). The Scottish Government and Northern Ireland Assembly does not operate a WATOK licensing system and operatives killing animals outside a slaughterhouse require a CoC (WATOK (Scotland) 2013 and (Northern Ireland) 2014). Similar exemptions to certification requirements also exist.

18. Emergency killing is defined as "*the killing of animals which are injured or have a disease associated with severe pain or suffering and where there is no other practical possibility to alleviate this pain or suffering*". Under Article 19 of Regulation 1099/2009, any effective method of killing that satisfies the General requirements for killing and related operations (Regulation 1099/2009, Article 3(1)&(2)) is considered permissible and the keeper of the animals concerned shall take all the necessary measures to kill the animal as soon as possible. Essentially, any effective method of killing, which does not cause avoidable pain, distress or suffering can be used to ensure the animal is put down as soon as possible. WATOK requires that, under emergency killing procedures, an animal unable to walk is killed where it lies if moving it would cause unnecessary pain and suffering.

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<sup>6</sup> <http://www.food.gov.uk/enforcement/sectorrules/meatplantsprems/meatpremllicence>

19. Regulation 1099/2009 and WATOK also apply to the depopulation of animals for public health, animal health, animal welfare or environmental reasons.

20. Guidance on the legal requirements applicable in slaughterhouses and for on-farm killing can be found on GOV.UK<sup>7</sup>. Relevant European legislation will be retained under the European Union (Withdrawal) Act 2018, with minor amendments to make it operable as domestic legislation.

### **Advice by FAWC, EFSA and others relating to the topic**

21. Previous FAWC advice relating to the welfare of goats at the time of killing include FAWC Reports on the Welfare of Farmed Animals at Slaughter or Killing, Part One, Red Meat Animals (2003)<sup>8</sup> and FAWC's Opinion on the welfare of animals killed on-farm (2018)<sup>9</sup>.

22. There are a number of EFSA publications relevant to the welfare of goats at the time of killing. These include: the 2006 Scientific Opinion of the Scientific Panel on Animal Health and Welfare (AHAW) on a request from the Commission related with the welfare aspects of the main systems of stunning and killing applied to commercially farmed deer, goats, rabbits, ostriches, ducks, geese. More recently, Scientific Opinions on monitoring procedures at slaughterhouses for sheep and goats<sup>10</sup>. It should be noted that the scientific data on goats contained within the EFSA reports is limited.

23. The Humane Slaughter Association produces guidance documents on the welfare of farmed animals at slaughter and killing, including for goats<sup>11</sup>.

### **Industry landscape**

24. The total UK goat population taken from Defra Farming Statistics for 2018 is 108,000 (3.2% increase on 2017)<sup>12</sup>. We were informed at consultation that this is likely to be an underestimate. Many pet goats or small herds may not be registered with Defra or the Scottish, Welsh or Northern Irish Governments as required by Regulation 21/2004 and SAGRIMO 2009. It is the responsibility of goat keepers to register the premises they are kept on as a holding, identify goats with ear tags and record/report their movements.

25. We were informed at consultation that average goat herd size is less than 10 animals but there are around 100 herds with more than 100 goats and these constitute approximately 60% of the total goat population. Larger herds are mostly in the dairy sector.

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<sup>7</sup> <https://www.gov.uk/government/collections/welfare-of-animals-at-the-time-of-killing> and <https://www.gov.uk/guidance/knackers-yards-and-farms-restraining-stunning-killing-animals>

<sup>8</sup> <https://www.gov.uk/government/publications/fawc-report-on-the-welfare-of-farmed-animals-at-slaughter-or-killing>

<sup>9</sup> <https://www.gov.uk/government/publications/fawc-opinion-on-the-welfare-of-animals-killed-on-farm>

<sup>10</sup> Sheep and Goats - published on the 20<sup>th</sup> December 2013 and available at <http://www.efsa.europa.eu/en/efsajournal/pub/3522>.

<sup>11</sup> <https://www.hsa.org.uk/>

<sup>12</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/869062/structure-jun2018final-uk-28feb20.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/869062/structure-jun2018final-uk-28feb20.pdf)



## Dairy goats

26. Premises producing milk for sale for human consumption should be registered with the FSA under food hygiene rules and are subject to inspection. FSA reported to us 121 commercial dairy goat farms in England and Wales, holding a total of 44,782 goats, including milking goats (in milk and dry); all kids, replacement females (first time kidders), breeding males and any males destined for meat (December 2017).

<b>Dairy herd size (number of goats)</b>	<b>Number (%) of farms this size</b>
50 or less	42 (35%)
51 – 200	29 (24%)
201 – 500	17 (14%)
501 – 1000	21 (17%)
>1000	12 (10%)

27. To estimate numbers of male kids born to the UK milking herd per annum we were informed at consultation that approximately two thirds of a herd are milking goats and females over 12 months. The rest would be kids, breeding males and males kept for meat. Taking a rounded figure of 45,000 goats, two thirds is 30,000. The average kidding rate could be 1.6-1.8 at each kidding (and assuming 50% male 50% female) if every female kids every year the maximum total male kids would be  $(30,000 \times 1.8 \times 0.5) = 27,000$  male kids per year. Most farms will not achieve an average of 1.8 kids reared for various reasons including natural pre-weaning mortality. First time kidders are more likely to have an average of around 1.6 kids. Longer lactations will also reduce the number of kids born.

28. Within the dairy goat sector, the average breeding lifespan of a female is 6 years, which allows for 3-4 pregnancies and 6-9 kids born per dam. We were informed at consultation that breeders were aiming to extend lactation time reducing the number of pregnancies and reducing the number of kids born. This would reduce the number of male kids that have to be disposed of when they cannot be reared for meat or sold for other purposes, e.g. as pets or to small holders. In future, given the necessary research, it is possible that sexed semen may further reduce numbers of unwanted male goats.

29. Fluctuation in demand for goat's milk and cancelling of milk contracts will have effects on the numbers of dairy goats kept. Culling rates can be increased when milk demand falls. Average commercial cull figures would be expected to be around 20% as a replacement rate from voluntary and involuntary culling.

30. The Goat Veterinary Society (GVS) estimated that 50-75% of surplus male kids from the dairy sector would be reared for meat but demand varied significantly both locally and seasonally. In October 2019 the British Veterinary Association, the British Cattle Veterinary Association, the British Veterinary Poultry Association and GVS published a position on surplus male production animals<sup>13</sup>. They recognised

<sup>13</sup> <https://www.bva.co.uk/news-campaigns-and-policy/policy/ethics-and-welfare/surplus-male-production-animals/>

that quality of life should always take precedence over lifespan but felt that industry should move away from the production of surplus animals and seek solutions to the killing of unwanted animals. We would also flag the potential for unwanted male goats to be diverted to inappropriate rearing facilities if the economics of their production for meat are not sufficiently developed.

### **Meat goats**

31. GVS estimates that there are 15,000-20,000 commercial meat goats in the UK, predominantly Boer or Boer X breeds, as well as surplus males from the dairy industry and cull nannies entering the food chain.

32. The Milking Goat Association estimate that 90% of cull nannies are killed through approved commercial slaughterhouses with the balance killed on-farm. Surplus male kids from the dairy sector may be killed on farm or may be reared for meat either directly by the dairy farm or by a specialist rearer.

### **Disposal of fallen stock (animals that died or were killed on farm)**

33. Numbers of goats entering the Fallen Stock Scheme were 4,879 in 2016 and 4,398 in 2017<sup>14</sup>. Most goats collected are over 12 months of age, although it was reported that a significant number are collected at 0-1 month old.

34. There are other registered knackers' yards taking cull goats apart from those who are members of the Fallen Stock Scheme. Also, a small number of goats may be disposed of on-farm where there is a SRM licensed incinerator.

### **FSA Survey of slaughter methods 2018**

35. A survey of slaughter methods across England and Wales was undertaken by the FSA over one week; 29 January to 4 February 2018<sup>15</sup>. The number of Goats slaughtered in that week was 402 in 48 abattoirs. 88% of goats were sourced directly from farm, 11% sourced from markets and 1% sourced from dealers. Of 402 goats slaughtered the methods used were: 62.9% standard slaughter; 29.6% Halal stunned (in compliance with Annex I of Regulation 1099/2009); 7.5% Halal non-stunned and none by Shechita.

### **Other goats**

36. It is estimated that between 6,000 and 8,000 angora (mohair) goats are kept in the UK for the production of fibre<sup>16</sup>. There are no cashmere herds in the UK although some cashgora cross-breed animals are found within angora herds<sup>17</sup>. We were told at consultation that herd size is from 2–200 but on average contains 30–40 goats. Kids are not culled and animals are typically kept until the end of their natural life, although some nannies of over five years were culled. Angora goats are mostly horned and so are separated both in transit and at slaughter. This can be a problem where goats which have been kept together find separation stressful.

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<sup>14</sup> Data from the Fallen Stock Scheme

<sup>15</sup> <https://www.gov.uk/government/publications/farm-animals-survey-of-slaughter-methods-2018>

<sup>16</sup> British Angora Goat Society estimate.

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[https://www.smallholder.co.uk/news/11181710.The\\_Angora\\_goat\\_is\\_an\\_ideal\\_alternative\\_for\\_a\\_smallholder\\_without\\_the\\_time\\_to\\_milk/](https://www.smallholder.co.uk/news/11181710.The_Angora_goat_is_an_ideal_alternative_for_a_smallholder_without_the_time_to_milk/)

37. Small numbers of goats are kept for pedigree breeding, public display (e.g. petting farms) and wilding projects. They are also kept as pets (including pygmy goats) and on smallholdings. If estimates above are accurate then these small herds might amount to approximately 30,000 goats.

38. However, it has already been noted that the total known figure for the goat population is probably an underestimate because of owners failing to register holdings where goats are kept. This has serious implications for disease control as well as contributing to a lack of information on how these animals are removed from the population at the end of their lives. Management of goats should prevent uncontrolled breeding and plans should be made before birth for the care of kids in order to minimise unnecessary killing. The legal requirements applying to the keeping of goats by private keepers are highlighted in this Opinion, as is their importance in the event of an outbreak of notifiable disease.

### **Key biological and behavioural differences between sheep and goats**

39. Goats are often naturally considered alongside sheep, and while there are many similarities between them, there are also important biological and behavioural differences. Taxonomically, sheep and goats belong to separate genera (*Ovis* for sheep and *Capra* for goats). Most goats have two horns and although some individuals are naturally polled (lack horns), producing polled goat breeds is challenging because the genes determining sex and horns are closely linked, leading to sterility when crossbreeding polled individuals. Goats have a wide panoramic field of view and binocular colour vision, and a well-developed sense of smell. In general, goats have hair coats that do not require shearing.

40. Goats are regarded to be naturally more curious, bold and agile than most breeds of sheep. They are able to climb and balance and this, combined with their inquisitiveness, means they are able to escape pens that are designed to contain sheep. Goats are also usually taller than sheep with longer legs, which has implications for whether the same handling systems may be used for both species. Goats are less fearful of new experiences (neophobic) than sheep and will explore unfamiliar surroundings and investigate objects with their prehensile upper lip and tongue. The foraging behaviour of goats differs from sheep in that they are natural browsers, eating leaves and twigs as well as broadleaf weeds and grasses. In groups, goats display less consistent herding behaviour than sheep, and they are more independent and less fearful of humans. As such, goats tend to spread out more widely while grazing. Goats are more likely than sheep to be aggressive to humans, by charging or butting.

41. Depending on breed and nutrition, goats become sexually mature at between three and 15 months. In temperate regions, onset of the breeding season is stimulated by shortening day length, and during this time, nannies come into oestrus every 21 days. Farmers and goat breeders use traditional mating and artificial insemination reproduction methods. Gestation lasts approximately 150 days, and following kidding, milk production commences. The quantity produced relates to the

breed, age and diet of the nanny. Commercial lactation is usually 305 days but nannies that have not been bred and continuously milked will continue lactation beyond this.

42. Cattle, sheep and goats have extremely variable skull morphology<sup>18</sup> – particularly with regard to the presence, size and internal complexity of the frontal sinuses. These are air-filled paranasal spaces, located within the expanded frontal bone, which occasionally extends up into the horncores (Farke, 2010). It has been suggested that the enlarged frontal sinuses of horned sheep and goats may be an adaptation for head-to-head combat and that these structures may have a shock absorbing function – protecting the brain from impacts to the horns (Farke, 2008<sup>19</sup>). The sinuses are defined by two layers of cortical bone: one at the outer table of the skull (the ‘external cortex’) and one forming part of the surface of the endocranial cavity (‘internal cortex’). Bony struts (usually numbering between four and six on each side in goats, with a typical thickness of 1 mm or less) may divide the sinuses into a series of interconnected chambers. Comparative morphological analysis suggests that relative frontal sinus size and complexity, as well as ramming behaviour, has a strong phylogenetic component (Farke, 2010). Both sheep and goats have an extensive frontal sinus that occupies the entire frontal bone, but the sinuses are less prominently strutted in goats compared to sheep (Farke, 2010). Particularly in older males and horned goats the sinuses may absorb the energy from a non-penetrative captive bolt device or reduce the depth of penetration of the bolt into the brain when a penetrative captive bolt stunning device is deployed. Both could result in reduced effectiveness of the stun.

### **On-farm killing**

43. FAWC’s Opinion on the welfare of animals killed on-farm included discussion of decision making, competence, confidence, training and supervision. It also defined different killing purposes such as emergency killing, management culling, home slaughter, and these terms are used here.

44. AWC considers that when done correctly, purposefully and for the right reasons, on-farm killing is a beneficial welfare act. Well-planned management killing may reduce the need for unplanned emergency killing. Timely decision making and the right killing method are likely to reduce the duration and severity of any pain and distress.

45. A keeper should be competent in recognising animal welfare issues and confident in decision-making about when to kill an animal. They or their staff should hold a WATOK licence (or CoC) demonstrating they have the knowledge, skills and equipment required to kill an animal (unless exemptions apply – paragraph 17) or be able to procure professional assistance quickly.

46. Rules relating to on-farm killing are enforced by both APHA and local authorities, particularly in response to complaints. In the slaughterhouse the official

<sup>18</sup> Farke, 2010 - <https://academic.oup.com/zoolinnean/article/159/4/988/2281460>

<sup>19</sup> Farke, 2008 - <http://jeb.biologists.org/content/211/19/3085.long>

veterinarian is present to monitor and enforce animal welfare standards but on-farm there is no permanent presence to carry out checks. In FAWC's Opinion on the welfare of animals killed on-farm<sup>20</sup> it was recommended that a priority should be raising awareness about the rules for on-farm killing among animal keepers and enforcers, as well as enforcement responsibilities, processes and contacts for APHA and local authorities.

### **Management culling**

47. Management culling is the killing of animals, not usually for human consumption, removed from the herd before they reach either their normal slaughter age/weight or their full economic potential. Animals may be culled for management purposes (e.g. unwanted males, runts or poor do-ers) or if they have an injury or a disease not associated with severe pain or suffering but which fails to respond to treatment. In the latter case animals may be considered not to have a life worth living and humane killing should be timely. The numbers of unwanted male goats that may need to be killed on farm at an early age if meat markets are underdeveloped and how this is done could be a welfare concern.

48. Of the stunning/killing methods we consider in this report, it is worth noting that a non-mechanical (manual) percussive blow to the head (e.g. blunt force trauma using a hand held implement or swinging an animal against a hard surface) is not a legal routine stunning method in any species (of any age), with the exception of rabbits.<sup>21</sup> It needs to be more widely understood by the industry that using blunt force trauma when culling goats is illegal<sup>22</sup>.

49. The gas stunning or killing of goats on farm or at the slaughterhouse is illegal.

50. FAWC's Opinion on the welfare of animals killed on-farm covered goats and neonates in particular<sup>23</sup>. Adult goats may currently be stunned/killed by penetrative captive bolt, electrical tongs (followed by a killing method such as bleeding) or free bullet from a firearm.

51. Recent research suggests that a non-penetrative (percussive) captive bolt applied to the back of the head would stun and kill 100% of neonate goats<sup>24</sup>. Currently, this is only permitted as a simple stunning method for the slaughter of ruminants and a separate killing method (i.e. bleeding) must follow. Use of a free bullet method on neonate goats has inherent dangers for operative safety and animal welfare. Consideration should be given to changing the law to allow a non-penetrative captive bolt of sufficient power (28 Joules, Sutherland et al, 2016) to be used in the correct position to kill neonate goats without a follow-up killing method, i.e. not to be classified as a simple stunning method in these circumstances, also that it be able to be used on-farm. (Also reference paragraph 81)

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<sup>20</sup> <https://www.gov.uk/government/publications/fawc-opinion-on-the-welfare-of-animals-killed-on-farm>

<sup>21</sup> WATOK Schedule 2, Part 5(36).

<sup>22</sup> <https://www.gov.uk/government/collections/welfare-of-animals-at-the-time-of-killing> and <https://www.gov.uk/guidance/knackers-yards-and-farms-restraining-stunning-killing-animals>

<sup>23</sup> Farm Animal Welfare Committee, [FAWC opinion on the welfare of animals killed on-farm](#), 2018

<sup>24</sup> Sutherland, MA; Watson, TJ; Johnson, CB; Millman, ST, Evaluation of the efficacy of a non-penetrating captive bolt to euthanase neonatal goats up to 48 hours of age, *Animal Welfare* 25 (2016), 471–79; Grist, A; Lines, JA; Knowles, TG; Mason, CW; Wotton, SB, Use of a non-penetrating captive bolt for euthanasia of neonate goats, *Animals* 8 (2018), 58.

## **Emergency killing**

52. Emergency killing is defined in Regulation 1099/2009 (ref. Paragraph 18). Emergency killing should be applied to spare an animal avoidable pain, distress and suffering; its needs must be met until the time of killing; and it must be killed as soon as possible.

53. We would reiterate that routine on-farm management culling of unwanted animals or those reaching the end of their productive lives does not fall under the definition of emergency killing. The stunning methods described above and set out in Annex 1 of Regulation 1099/2009, followed as necessary by a killing procedure, must be used to ensure a humane death.

## **Home slaughter**

54. Goats may be killed on-farm by the owner, or someone under their responsibility and supervision, for private consumption by them and their immediate household. In all cases, stunning and killing should be done humanely and legislation requires that specified risk material (SRM) must be removed, stained with a meat marking dye and professionally disposed of<sup>25</sup>.

## **Pet goats and smallholders**

55. Because all goats are classified as livestock the legal requirements that apply to farmed animals during their lifetime and at killing must be met. Registration, identification, movement recording/reporting and welfare regulations apply equally to pet and small herds of goats as to commercial herds. Following the killing of a goat the keeper must update the animal register for the holding. The keeper must also maintain a record of all veterinary medication administered to goats. Moreover, carcasses must not be buried or cremated by the owner on their holding but disposed of by an approved method. Goat owners who regard their animals as pets may engage a veterinarian, to visit the premises to kill a non-food animal by lethal injection and these animals must likewise be disposed of correctly.

56. In any part of the UK, the carcass may only be cremated at a pet crematorium if it has been approved by the Animal and Plant Health Agency for the disposal of specified risk material (SRM)<sup>26</sup>. The remains may not be returned to the owner in any form under SRM regulations. We understand from consultation that there are very few approved pet crematoria and pet goat keepers may need to investigate alternative methods of disposal, e.g. the Fallen Stock Scheme.

## **Transport**

57. If a live animal is taken off-farm for killing, such as to a slaughterhouse because it is intended to enter the food chain or to a knacker's yard, an animal

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<sup>25</sup> The Transmissible Spongiform Encephalopathies (England) Regulations 2010 (as amended) (SI No. 2010/801) and similar legislation in Scotland, Wales and Northern Ireland.

<sup>26</sup> EC Regulation 999/2001, Annex V, 1.

movement document must be completed (manually or electronically) and the movement reported within three days. The registered keeper should already hold a general movement license and have identified the animal by means of an ear tag, and either a second ear tag or tattoo, each giving the herd number and the animal's unique number.

58. There are reporting systems in England and each of the devolved territories:
- In England, the individual movement must be notified to the Animal Reporting and Movement Service (ARAMS) online or by telephone during office hours.
  - In Scotland, a triplicate movement document must be completed and submitted to the Scottish Animal Movement Unit (SAMU).
  - In Wales, movements must be reported to Electronic Identification Development Cymru (EIDCymru) either online or on a paper form, which is submitted by the slaughterhouse as the receiving keeper.
  - In Northern Ireland, the required information is submitted online to the Animal and Plant Health Inspection Service (APHIS).

59. For disease control purposes, when goats are moved to a holding from a different holding then those goats must not be moved off that new holding for a period of 6 days (standstill time) unless they have been kept in isolation from all other goats or they are moved direct to slaughter<sup>27</sup>.

60. As with other farmed animals, commercial goat transport is regulated by Council Regulation (EC) No. 1/2005 on the protection of animals during transport and related operations as implemented by the Welfare of Animals (Transport) (England) Order 2006 (WATEO) (and similar legislation in Scotland, Wales and Northern Ireland). When the travel distance is more than 65km there are more stringent requirements. For distances less than 65km, basic welfare conditions still apply: for example, goats must be fit to travel and must not be transported in a way likely to cause injury or undue suffering; the journey time must be minimised; the animals' needs must be met during the journey; loading/unloading facilities must be adequate.

61. The recently published guide 'Good practices for animal transport in the EU'<sup>28</sup> (Consortium of the Animal Transport Guides Project (2017)) does not identify specific issues for the transport of goats but it is reasonable to assume that the concerns relating to the other livestock species will be relevant to the transportation of goats.

62. During transport, there is a requirement to separate goats of significantly different sizes or ages, sexually mature males from females, animals with horns from animals without horns, animals hostile to each other and tied animals from untied animals. However, separation is not required where the animals have been raised in compatible groups, are accustomed to each other, where separation will cause distress or where females are accompanied by dependent young. Defra guidance exists for transporters of goats<sup>29</sup>.

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<sup>27</sup> <https://www.gov.uk/guidance/register-land-you-use-to-keep-livestock#standstill-restrictions>

<sup>28</sup> <http://animaltransportguides.eu/>

<sup>29</sup> <https://www.gov.uk/government/publications/welfare-of-animals-during-transport-advice-for-transporters-of-goats>



63. Fitness to travel rules prohibit the transportation of very young kids (less than one week), pregnant females where 90% of gestation has passed and females who have given birth in the last seven days. When goats “in milk” are transported without their suckling young, they must be milked at intervals of no longer than 12 hours. As with male dairy calves, goat dealers collect young male kids for fattening which means that many young kids are transported. These collections, mixing and redistributions have biosecurity implications and might have health/disease outcome issues (e.g. increased mortality, increased antibiotic use).

64. Animals that do not meet fitness to transport criteria can only be moved under veterinary supervision for or following veterinary treatment or diagnosis, and only where no unnecessary suffering or ill-treatment is caused to the animals concerned<sup>30</sup>. However, sick or injured animals may be considered fit for transport if they are slightly injured or ill and transport would not cause additional suffering. In cases of doubt, veterinary advice shall be sought. Animals sent for slaughter must be reasonably believed to be fit for consumption.

65. Vehicles used for transport of goats must meet the legal requirements, i.e. have adequate sides and a roof since there is a risk of goats escaping by climbing and jumping. We were informed at consultation that goats are particularly prone to trapping their feet, legs or horns in gaps in the sides of vehicles, so this must be taken into account when considering suitable trailers. There is limited research on the welfare of goats during transport, but there is good evidence that handling, loading, novelty of environment, long periods of standing, deprivation of food and water even for a short time, noise and vibration from the vehicle and social disruption are all potential stressors.

66. Behavioural evidence of stress in goats such as jumping and bleating is apparent, particularly at the start of the journey. Aggression may be an issue during transport in goats and is exacerbated by close confinement; it is characterised by horn hooking and head butting. The risk of injury increases when horned goats are placed in crowded conditions. Goats prefer to stand parallel to the direction of travel, although body positions frequently change. Research has shown that postural instability and falling in goats is closely associated with driving style. Almost all of the available research has focused on transport in hot conditions, reflecting the climate of geographical areas where traditional extensive goat production is prevalent. The results show that transport under extreme ambient temperature conditions generates significant physiological and muscle metabolism responses with meat quality implications. There is a lack of research into the welfare implications of transport of goats in temperate climates.

### **Emergency killing in transit**

67. When goats are injured during transport it may not be possible to move the animal without causing further pain and distress, for example with a road traffic accident. To avoid further suffering it may be appropriate to kill the animal in situ.

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<sup>30</sup> Council Regulation (EC) No. 1/2005 on the protection of animals during transport, Annex I, Chapter I, 3(c)



The rules for emergency killing in transit are the same as for emergency killing as defined in Regulation 1099/2009 and discussed above.

## **Slaughterhouses**

68. Goats are classified as livestock and must be slaughtered in accordance with Regulation 1099/2009 and WATOK. The majority of animals are slaughtered at approved slaughterhouses. There is little published information on slaughter practices for goats, with most slaughterhouses reported to use the same methods as employed for sheep.

69. As mentioned in paragraphs 39-42, goats have particular needs and are different to sheep, although they are likely to be processed through the same slaughterhouses. There are physiological differences in skull and leg length from sheep and behavioural differences affecting design of lairage, handling and restraint.

70. Each person handling and stunning/slaughtering goats in the slaughterhouse has to have a certificate of competence (CoC) for those operations involving sheep and goats that they undertake.

## **Unloading**

71. Due to the relatively small numbers of goats sent for slaughter the unloading facilities used for goats will normally have been designed for sheep or other species. This may include concrete ramps to which a vehicle carrying animals can reverse and unload. The advantage of this design is that it can accommodate a variety of different types of livestock transport. Smaller slaughterhouses may not have specialised unloading facilities such as ramps and livestock vehicles will unload onto a level hard surface. As this is often the arrangement at the premises of origin it will not normally result in any welfare problems during unloading. Goats are generally nimble and do not appear to find unloading particularly difficult.

72. The slaughter premises' Standard Operating Procedures (SOP) should include actions to be taken in the case of arrival of injured animals and this would normally include a provision to kill an animal on the vehicle if moving it will result in pain, distress or suffering.

## **Lairaging**

73. Lairage facilities used for goats will often have been designed for sheep or other species and as such may consist of pens constructed with bars rather than solid walls. Goats will tend to climb up on the bars and an assessment will need to be made of the risk for the goat in trying to climb over the pen sides. Premises with solid walls are better suited to handling goats and pen sides should be of a suitable height to prevent climbing. Floors and raceways, water drinkers and feeders if suitable for sheep will normally be suitable for goats. Regulation 1099/2009 (Annex

II, Annex III) contains specific requirements for lairage, such as design and construction to minimise risk of injuries and requirements for preventing escape.

74. Lactating goats should be identified on arrival and have arrangements for milking should that be necessary to relieve the udder. These animals as well as those that are sick, unweaned, that might have given birth or are at the end of pregnancy should be prioritised for slaughter. This should be reflected in the premises SOP.

### **Handling**

75. As a generalisation farmed goats tend to be more used to human interaction and handling than sheep. As a result, they exhibit fewer fright responses and tend not to bunch up. The human interaction that goats are used to can result in a degree of “stubbornness” and those handling them in the lairage should be aware of this. Procedures for handling goats should be laid down in the premises SOP. A head collar or lead rope might be appropriate for some goats where this has been used previously on farm.

### **Restraining**

76. Restraining facilities in slaughterhouse will vary depending on the volume of throughput the premises normally handles. Small premises may use group stunning pens where several animals are held in a pen and the slaughterer individually restrains each goat for stunning. These are variable in design and consideration must be given to ensuring that there are facilities that allow the size of the pen to be reduced in order to deal with small numbers of animals. FSA guidance is available on group stunning systems<sup>31</sup>. For religious slaughter without prior stunning goats must be mechanically and individually restrained.

77. Larger slaughterhouses may have installed V-restrainers for sheep. These may not always be suitable for goats depending on the design because goats may have longer legs than sheep. V-restrainers have a supporting metal frame underneath and the operator will need to ensure that there is adequate clearance for the goats' legs below the conveyer and that goats are correctly supported. If it is considered that the V-restrainer is not suitable for restraining goats, then the premises SOP must reflect this and provide guidance on an alternative process for restraining goats. It is a legal requirement that each person restraining goats must be certified for restraining sheep and goats on their CoC. The OV for the premises will check the welfare of the animals in whichever system is deployed.

### **Method of slaughter**

78. Slaughter method will vary with the premises and what facilities they have. When goats are stunned before slaughter, slaughterers need to use legally allowed

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<sup>31</sup> <https://acss.food.gov.uk/sites/default/files/fsa-group-stunning-2017.pdf>

methods under Regulation 1099/2009 and WATOK. These include the commonly used methods of electrical stunning or a captive bolt gun. Non-penetrative captive bolts can only be used for ruminants under 10kg, while a penetrative captive bolt can also be used for animals over 10kg. Both electrical and captive bolt stunning provide what the legislation considers to be a simple stun and must be followed as soon as possible by bleeding to result in death. Any person slaughtering a goat must be certified for stunning and slaughter of sheep and goats on their CoC.

79. WATOK implements and enforces Regulation 1099/2009 and contains stricter national rules, including for when animals are slaughtered without stunning by either the Jewish or Muslim method. When this method is used the goat must be individually and mechanically restrained by the slaughterer, have both carotid arteries or the vessels from which they arise cut and not be released from restraint until it is unconscious and/or at least 20 seconds have elapsed. EFSA have issued guidance on monitoring unconsciousness (ref paragraph 22). In the case of slaughter by religious rites the person must be of the Jewish or Muslim faith and hold a CoC that includes slaughter of sheep and goats by religious rites.

#### **Mechanical penetrative stunning of goats in slaughterhouses**

80. There is specific advice pertaining to mechanical stunning of goats since they have a large bony mass on top of the skull (Cooney et al 2012) which will absorb energy from the captive bolt and may prevent bolt penetration through to the brain cavity.

81. There is limited published scientific information on penetrative captive bolt and free bullet shot position and angulation for adult goats. WATOK (Schedule 2, Part 5, section 34.3), for penetrative captive bolt stunning, states that goats must not be shot in the back of the head (unless horns are present). However, there is HSA advice (<https://www.hsa.org.uk/positioning/goats>) that for captive bolt stunning of all goats this should be placed behind the bony mass on the mid-line and aimed towards the base of the tongue, irrespective of whether they have horns or not. Collins et al 2017<sup>32</sup> also suggested a shot position slightly more caudal (back of the head) would be effective. Due to this apparent inconsistency further research is needed to determine the optimum shot position for adult goats. (See paragraph 51 regarding non-penetrative captive bolt use on neonate goats).

#### **Electrical stunning of goats in slaughterhouses**

82. For electrical stunning, head-only stunning electrodes should be placed so that they span the brain as directly as possible. For sheep, it is recommended that scissor-type tongs are positioned on either side of the head between the eye and ear. However, this may not be possible in goats with large horns, and an alternative method of stunning should be used.

83. In Regulation 1099/2009 the minimum legal current of 1.0 A is required for effective stunning of sheep and goats.

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<sup>32</sup> <https://avmajournals.avma.org/doi/pdf/10.2460/ajvr.78.2.151>

84. Research on high frequency electrical stunning (1.0 A, 850 Hz) of goats has suggested that this method has advantages in terms of permissibility of stunning for halal slaughter (prevention of cardiac arrest) and meat quality (reducing convulsions) compared to low frequency head-only and head-to-body electrical stunning (Sabow et al 2018). The authors reported that high frequency was effective in inducing insensibility in minimally anaesthetised goats, did not induced cardiac arrest and the proportion with severe clonic muscular activity was reduced (Sabow et al 2018). However, this study did not examine the period of induced insensibility. Caution should be taken with these results as studies in other species have demonstrated that high frequency stunning requires higher current levels and the duration of induced unconsciousness, and thus available stun to stick time, is generally less than that produced with low-frequency stunning. AWC's opinion is that more research is needed on high-frequency head-to-body stunning of goats before it is permitted commercially.

### **Bleeding of goats**

85. It is a legal requirement that following stunning the two carotid arteries or vessels from which they arise must be severed to allow rapid bleed out<sup>33</sup>. The easiest way to achieve this is by a large transverse cut across the neck, which we were told at consultation is widely in use in slaughterhouses. However, the meat hygiene legislation requires that, for food safety reasons, the neck cut does not transect the oesophagus or trachea, apart from during religious slaughter. There is a conflict in the legislation between producing a profuse bleed and meeting hygiene requirements although it appears that the welfare regulations are being applied.

86. The Humane Slaughter Association also recommend that following stunning a rapid bleed out can be achieved if goats are stuck close to the heart in a similar manner to pigs. We note that this is very rarely done in abattoirs because of a lack of experience in trainers and slaughterers in using this method.

### **Non-stunned slaughter of goats**

87. There is limited research on non-stunned slaughter of goats. The three main areas of research on the topic historically relate to: brain perfusion, time to death and the pain of the neck cut.

#### *Cerebral perfusion and time to death*

88. There is limited information on the cerebral perfusion of the brain of goats. In goats and sheep the brain is supplied principally by the common carotid arteries, via the maxillary artery which gives off dorsally directed rete branches. These branches link with the *rete mirabile* (Andersson and Jewell 1956, Schummer et al 1981). In goats and sheep the *rete mirabile* is less complex than in cattle with less side-to-side anastomosis (Baldwin 1971). The left and right *rete mirabiles* connects to the arterial circle supplying blood to the entire brain. In goats the vertebral arteries communicate directly with the common carotid via the occipital arteries. However, unlike in cattle,

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<sup>33</sup> Council Regulation (EC) No. 1099/2009, Annex III, 3.2

there is no direct connection between the vertebral arteries and the *rete mirabile*. Andersson and Jewell (1956), reported that blood from the vertebral arteries make no contribution to cerebral perfusion in goats and only supplies the cervical spinal cord and posterior medulla (Baldwin 1971, Andersson and Jewell 1956).

89. There appears to be little direct published information on the time to loss of consciousness following non-stunned slaughter in goats comparable to slaughterhouse practice, although EFSA have produced monitoring guidelines. Most authors generally reference figures relating to sheep. For sheep the mean time to loss of consciousness is generally quoted as being  $14 \pm 1$  seconds following slaughter without stunning. Based on the results in 20 sheep, researchers estimated that 95% of animals would be unconscious by 22 seconds. Sample size was not sufficient to provide more than an estimate, (Gregory and Wotton 1984). It has been suggested that the reason for this short and narrower period for time to loss of consciousness in sheep compared to cattle is due to the differences in cerebral perfusion supply between the species, principally the contributions of blood from the vertebral arteries and the suggested lack of formation of false aneurysms (carotid ballooning) on the severed ends of the carotid arteries in sheep (Gregory et al 2006).

90. Recent research by Sabow et al (2016; 2017; 2018) examined the pain of the cut in conscious and minimally anaesthetised goats. They reported significant increases from baseline of EEG indices associated with noxious sensory input. The act of slaughter without stunning would therefore seem to result in the goat experiencing pain.

### **Approval to slaughter goats**

91. The FSA approve slaughterhouses to slaughter goats in England, Wales and Northern Ireland. A similar process is in place for Scotland under Food Standards Scotland.

92. The Food Business Operator must make an application to the FSA (or FSS) for approval and in the case of slaughterhouses slaughtering goats will be assessed to determine if the facilities are suitable for these animals.

93. After the application has been verified the premises will receive a visit from an FSA veterinarian to inspect the premises, including a review of structural facilities and how they relate to animal health, welfare and meat processing hygiene. This will include an assessment of the handling, restraint and slaughter facility, the animal welfare arrangements and the premise's Standard Operating Procedure (SOP).

94. If a premise is considered to meet the legislative requirements it will receive conditional approval with a further visit within 3 months. The total approval process must not exceed six months and where necessary a final visit will take place before the six-month approval period has expired.

95. Where the premises wish to slaughter goats the unloading, lairage, handling, restraint and slaughter methods will be assessed by an FSA lead veterinarian

carrying out the approval visit. Only if there are no concerns about welfare and all conditions have been met on the day, as well as full compliance with other legislation will an approval be granted.

## Conclusions and Recommendations

96. Whilst there is little evidence historically from FSA reports of significant goat welfare issues in slaughterhouses, the increasing numbers of farmed goats and the physical and behavioural differences of goats from other livestock species draws attention to the need to address the suitability of the equipment and processes used in their killing. The industry should seek to achieve best practice in the killing of goats. We were informed at consultation that where goats are killed on the premises on which they have been kept there is a lack of information about how these animals are killed, how their welfare is protected, and the monitoring and enforcement activities undertaken.

97. *In FAWC's Opinion on the welfare of animals killed on-farm it was recommended that raising awareness about the rules for on-farm killing among animal keepers and enforcers is a priority. We would reiterate the point that goat keepers should be aware of their responsibilities at on-farm killing.*

98. Increases in the size of dairy goat herds, which increases the number of male kids destined for rearing for meat or killing on farm, will involve changes in production systems and this should be taken into account in policy and planning for animal health and welfare. The industry has and is undergoing continual change. The Code of Recommendations for the Welfare of Goats<sup>34</sup> is significantly out of date (1989) and should be reviewed to take account of these changes.

99. *AWC recommends that government, the veterinary profession and industry should consider the changes occurring in goat populations and production methods (e.g. increasing herd size in dairy goat herds) in policy and planning related to goat health and welfare, including end of life choices. The Code of Recommendations for the Welfare of Goats should be reviewed.*

100. We were informed through our stakeholder consultation that significant numbers of goats may be on premises that are not registered as livestock holdings with a CPH number, particularly in the pet or small herd sectors. There is a lack of knowledge of the legislative requirements pertaining to the keeping, identification and movement of goats, and that these apply to all goats. This is a risk for biosecurity and traceability during disease control.

101. *AWC recommends that industry and the veterinary profession raises awareness amongst goat keepers of the regulatory requirements relating to the ownership of goats.*

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<sup>34</sup> <https://www.gov.uk/government/publications/code-of-recommendations-for-the-welfare-of-livestock-sheep>

102. All goats are classified as livestock and their keeping and killing are regulated.

*103. AWC recommends that, to avoid underestimating the skills required to meet their welfare needs, all goat owners should be made aware that they must comply with the regulations relevant to farmed animals and all this involves, regardless of the purposes for which they keep goats or the premises on which they are kept*

104. Goats have significant biological and behavioural differences to sheep, although the species are often considered together in terms of their keeping, handling and killing.

*105. AWC recommends that government and industry should consider the differences in goat physiology and behaviour from other species in setting requirements for the keeping, transporting, unloading, handling, lairaging, restraining, stunning and killing of goats. This should be reflected in guidance and industry standards.*

106. Any person killing goats must be demonstrably competent to do so, including where killing takes place on farm. A WATOK licence is required for killing on farm in some circumstances but not all. Certificate of competence training modules for slaughter and related operations in slaughterhouses relate to both sheep and goats.

*107. AWC recommends that sufficient attention should be paid during the training for a certificate of competence and/or WATOK licence to the biological and behavioural differences between sheep and goats to ensure that animal handlers and slaughterers are competent in the slaughter of goats of all ages.*

*108. AWC recommends that anyone who may have to carry out emergency slaughter of goats should be suitably trained and competent in addition to the legislative requirements relating to a WATOK licence or a certificate of competence.*

109. Recent research on use of non-penetrative captive bolt guns of sufficient power on neonate goats (and other species) has identified its suitability as a killing method for this class of animals.

*110. AWC recommends that government should as a matter of urgency consider making the use of non-penetrative captive bolt guns of sufficient power (28 Joules, Sutherland et al, 2016) a legal killing method for neonate goats (and neonates of other species identified by research), i.e. not to be classified as a simple stun in these circumstances and able to be used as a killing method on-farm.*

111. AWC notes the conflict between animal welfare and meat hygiene legislation relating to bleeding of goats after stunning. Much of the industry carry out a transverse cut across the neck to achieve a rapid and profuse bleed even though this may be incompatible with meat hygiene rules where structures of the neck should remain intact. We do not anticipate any welfare deficit from current practices but there may be meat hygiene implications.

112. *AWC recommends that awareness is raised about the use of a thoracic stick to avoid possible contamination risks.*

113. There are gaps in the evidence base relating to the welfare of goats, including during transport and at the time of killing.

114. It is AWC's opinion that further research on non-stunned slaughter of goats needs to be performed to examine mechanical restraint, time to loss of consciousness, neck cutting procedures and the influence these have on animal welfare.

115. *AWC recommends that government, industry and NGOs support research and development into:*

- *Transport of goats taking into account their biological and behavioural differences to sheep and other livestock;*
- *Welfare implications resulting from the various positions the tongs may be placed on the head and the duration of contact of those tongs for the electrical stunning of horned goats;*
- *High frequency head to body electrical stunning and duration of induced unconsciousness in goats;*
- *Optimum position of captive bolt shot for horned and unhorned goats; and*
- *Time to unconscious and death and optimum neck cut position in non-stun slaughter of goats.*



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This is not an exhaustive list of the scientific evidence considered by AWC in the preparation of this Opinion.

## **APPENDIX 1 - Membership of AWC – 2020**

Peter Jinman – Chairman  
Martin Barker  
Dr Andy Butterworth  
Richard Cooper  
Dr Jane Downes  
Dr Troy Gibson  
Dr David Grumett  
Dr Carmen Hubbard  
Richard Jennison  
Richard Kempsey  
Dr Dorothy McKeegan  
Dr Romain Pizzi  
Dr Pen Rashbass  
Debbie Stanton  
Mark White  
Professor Sarah Wolfensohn  
Dr James Yeates

### **Advisors**

Dr Rebeca Garcia – Defra/APHA  
Sue Whitehead – Defra  
Collin Willson – FSA

### **AWC Secretariat**

Richard Aram  
Amy Coleman

Mike Elliott and Steve Wotton also assisted in the development of this report as members of the Welfare at Killing Committee before stepping down from FAWC.

## **APPENDIX 2 - Those who gave evidence or assistance**

British Angora Goat Society (BAGS)  
British Veterinary Association (BVA)  
Compassion in World Farming (CIWF)  
Goat Veterinary Society (GVS)  
Humane Slaughter Association (HSA)  
Milking Goat Society (MGS)  
Royal Society for the Prevention of Cruelty to Animals (RSPCA)  
Veterinary Public Health Association (VPHA)

We were also grateful to the owners of premises that assisted the Committee during its review.



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