Opinion on the welfare of cattle kept for beef production

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Farm Animal Welfare Committee
Nobel House
17 Smith Square
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The Farm Animal Welfare Committee is an expert committee of the Department for Environment, Food and Rural Affairs in England and the Devolved Administrations in Scotland and Wales. Information about the Committee can be found at: https://www.gov.uk/government/groups/farm-animal-welfare-committee-fawc.

FAWC Opinions are short reports to Government[1] on contemporary topics relating to farm animal welfare. They are based on evidence and consultation with interested parties. They may highlight particular concerns and indicate issues for further consideration.

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Welfare of farmed fish, 2014
Welfare of farmed and park deer, 2013
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Contingency planning for farm animal welfare in disasters and emergencies, 2012

[1] Where we refer to "Government" we are addressing the Department for Environment, Food and Rural Affairs in England, the Scottish and the Welsh Governments, and other responsible Government Departments and Agencies.

Contents

1. Scope

1. This Opinion considers the welfare of animals involved in the beef industry including dairy-derived beef calves and cows, and veal calves, up to but not including slaughter.

2. The aims are:

- To identify contemporary good practice in each of the major beef production systems within the context of animal health and welfare.
- To highlight areas within the industry where (a) welfare could be improved through practical changes in animal husbandry; (b) cattle welfare may be threatened.

2. Background

3. Although FAWC has previously considered aspects of the production and management of beef cattle, usually in the context of a broader review of other aspects of farm animal husbandry, it has never before examined the welfare of the beef animal from calf to abattoir. FAWC is aware of the pressures on the industry, both environmental and financial, the changing nature of husbandry systems, the increasing size of herds and particularly the increased use of indoor housing and containment.

4. FAWC gathered evidence for this Opinion through a review of peer reviewed and other literature, consultation with stakeholders, farm visits and interviews.

5. Within the Opinion citations are included as footnotes. These typically refer to other FAWC publications or scientific papers that offer a review of the subject or point in question; they do not represent the breadth of the evidence reviewed by FAWC.

a. Legal context

6. The legislation referred to in this Opinion may include additional amendments that are not specifically listed here. The referendum vote that the UK should leave the European Union (EU) came during the preparation of this Opinion. The ramifications for future legislation in the UK are not known.

7. All livestock keepers have legal obligations to ensure minimum standards of care for their animals under the Animal Welfare Act 2006 in England and Wales and the Animal Health and Welfare Act (Scotland) 2006. It is an offence to cause unnecessary suffering to any domesticated animal and reasonable steps must be taken to ensure that the needs of animals under the farmer's care are met.

8. In addition, all farmed animals are protected by the Welfare of Farmed Animals (England) Regulations 2007 and similar legislation in Scotland and Wales. These regulations transposed EU directives that set down minimum standards for the protection of farmed livestock; those of relevance to beef animals are 98/58/EC (all farmed livestock) and 2008/119/EC (calves). These include minimum

requirements relating to inspections, record keeping, appropriate treatment, freedom of movement and appropriate environments, buildings and equipment, feeding and watering and breeding (Schedule 1), and detailed requirements for calves being reared artificially (i.e. all those calves destined for veal or beef that are not being suckled by the mother).

9. The Mutilations (Permitted Procedures) (England) Regulations 2007, and similar legislation in Scotland and Wales, permit certain procedures to be carried out, such as ear-tagging, disbudding, dehorning and castration, provided specific requirements are adhered to. Tail-docking of cattle at any age is illegal.

10. The Welfare of Animals (Transport) (England) Order 2006, and similar legislation in Scotland and Wales, makes it an offence to transport any animal in a way which causes, or is likely to cause, injury or unnecessary suffering to that animal. It also provides the implementing legislation for the European Regulation EC/1/2005 which protects animals during transport and related operations, when carried out for a commercial purpose.

11. The Welfare of Animals at Markets Order 1990 (WAMO) contains rules covering the treatment of animals in markets to ensure they are not caused injury or unnecessary suffering. It also sets out detailed arrangements in respect of:

- handling, penning, bedding, food and water provision;
- the care of young animals, for example time limits on exposure for sale in markets and removal; and
- limits on how frequently calves pass through markets.

Responsibility for enforcing WAMO rests with local authorities.

12. "The Code of Recommendations for the Welfare of Livestock: Cattle", published in 2003 for England, details the statutory requirements associated with domestic regulations, provides guidance (now in need of review) on compliance and includes elements of good practice. Similar codes exist for Wales[2], Scotland[3] and Northern Ireland[3]. Livestock farmers and employers are required by law to ensure that all those with any responsibility for livestock care are familiar with, and have access to, the relevant Codes. Government and industry have produced guidance, for example on assessing the body condition of beef cattle, to assist in welfare assessments.

13. Artificial insemination in cattle is covered by the Artificial Insemination of Cattle (Animal Health) (England) Regulations 1985 (and similar legislation in Scotland and Wales) and its amendments. The Veterinary Surgery (Artificial Insemination) Order 2010 permits people who are not veterinary surgeons to carry out artificial insemination, provided certain conditions are met. Embryo transfer is covered by the Bovine Embryo (Collection, Production and Transfer) Regulations 1995, under which a veterinary surgeon must be satisfied that a cow receiving an

[2] Published in 2010
[3] Published in 2012

embryo is suitable to bring it to term and calve naturally before the technique can be used, and by the Veterinary Surgery (Epidural Anaesthesia of Bovines) Order 2010, under which people who are not veterinary surgeons are permitted to administer epidural anaesthesia to bovines for the purpose of embryo collection or transfer.

14. "The European Convention for the Protection of Animals Kept for Farming Purposes" (Council of Europe, 1976) and its recommendations on welfare set out conditions to avoid any unnecessary suffering or injury, and the requirement to take physiological and behavioural needs into account. There are specific recommendations, although these are now 40 years old, for all farmed livestock (1976) and for cattle and calf welfare (1993).

b. Commercial developments and national and international considerations

15. In 2017 there were 10 million cattle in the UK, of which the breeding herd of dairy and beef cows totalled 3.48 million. Beef production in the UK is based on three streams of supply: calves from the suckler herd, dairy and dairy/beef calves from the dairy herd, and adult cows and bulls (both dairy and beef suckler). In June 2017, there were 1.89 million dairy cows (54% of the breeding herd) and 1.58 million suckler cows (46%).

16. In 2017, the number of UK cattle slaughtered totalled 2.76 million, comprising 1.96 million steers, heifers and young bulls (71%); 662,000 cows and adult bulls (24%) and 135,000 calves (5%). Industry estimates indicate that around half the cattle killed for beef originated from the dairy herd.

17. Total domestic production of beef and veal was 901,000 tonnes in 2017, worth £2.99 billion; the proportion of self-sufficiency in beef stood at 81% in 2017 (Table 1).

Table 1. Beef production, import, export and consumption in the UK 2013-17 in thousand tonnes Carcass-Weight Equivalent (CWE)[4]

	2013	2014	2015	2016	2017
Production	840	871	880	913	901
Imports (EU)	268	290	310	304	325
(non-EU)	41	36	32	28	20
Exports	126	136	128	140	134
Consumption	1,023	1,061	1,094	1104	1112
Production as a % of consumption	82%	82%	80%	83%	81%

[4] Agriculture in the United Kingdom 2017 (table 8.2)

18. UK beef production is diverse, including:

- Cereal-fed young bull beef, typically housed throughout their lifetime and often slaughtered at 12 to 15 months.
- Steers and heifers that spend up to two grazing seasons at grass before being fed an energy-rich 'finishing' diet, and typically slaughtered at 16 to 30 months.
- Grass-finished animals, fed only a small amount of high-energy feed and typically finishing at 24 to 30 months.
- Calves from a small number of specialist veal units, either fed on a diet predominantly of milk and slaughtered under eight months (commonly referred to as rosé veal), or on varying proportions of milk or cereal and slaughtered over eight months (commonly referred to as rosé beef, young beef and rosé veal).
- Adult beef and dairy animals, previously used for breeding or milk production.

19. Farm assurance is a form of certified quality assurance used for agricultural products, typically foodstuffs. Assurance schemes remain voluntary in the UK. Uptake in the beef industry has largely been amongst beef finishing or breeder/finishing units, many of which have links to specific customers or processors.

20. At present, animals may be marketed as "farm assured" under some schemes if they have been kept on an assured farm for a specified number of days (e.g. 90 days for Red Tractor) prior to slaughter, and not for their whole life. Other schemes guarantee assurance from "farm to fork" or "paddock to plate", which includes the transport and slaughter process, although this does not always mean whole life assurance. Many beef cattle are not subject to any form of on-farm assurance.

21. FAWC has previously examined the impact of farm assurance schemes and found them to be associated with improved animal welfare[5]. There have been moves towards lifetime farm assurance for beef animals but, whilst potentially desirable from a welfare perspective, this remains challenging given the large number of units rearing weaned dairy and suckler calves. Such units may not have direct contact with processors or end-markets, and only experience indirect economic benefits from current schemes whilst having to maintain the additional records and inspection routines required by the scheme.

22. Both domestically and internationally, the beef sector is facing a number of challenges, including competition from countries that may have different welfare standards. Some non-EU countries use pharmacological growth promoters and have different requirements for identification, traceability, breeding and feeding practices. It is likely that these markets are more difficult for UK consumers, industry and government to influence in terms of welfare standards than domestic ones.

[5] Report on the welfare implications of farm assurance schemes, FAWC, 2005; Review of the implications for animal welfare of farm assurance schemes, FAWC, 2013

c. Farm income and animal welfare

23. The income of grazing livestock enterprises in the UK in 2016-17 averaged £17,000 for lowland and £24,000 for 'less favoured areas'[6]. In England, primary agricultural activity incurred a loss of £8,700 and £9,400 respectively, meaning that subsidies (Agri-environment and other payments; Single Payment Scheme) and other non-agricultural activities were responsible for the overall positive balance sheet[7].

24. Numerous stakeholders reported to FAWC that low farm profitability has implications for beef cattle welfare through reduced capacity for investment in infrastructure and staffing, although there is a lack of studies examining this direct relationship. FAWC previously examined the impact of low profitability on animal welfare and concluded that this is difficult to evaluate.[8]

25. Volatility in world markets affects all sectors in agriculture and whilst volatility in the beef market may not be as great as in some other sectors, it does cause problems and increases risk to farming businesses. The basic payment scheme and additional agri-environment schemes under the EU Common Agricultural Policy (CAP) provide additional income to the beef farmer, without which surviving the low prices when markets are depressed would be extremely difficult.

d. Advice by FAWC, EFSA and OIE

26. While FAWC has not previously reported directly on the welfare of beef cattle, its Opinion on the welfare of the dairy cow referred to the rearing of bull calves and other relevant topics: lameness, endemic diseases, metabolic diseases, injuries, infertility, stockmanship, lifespan and surveillance of stock[9]. FAWC's Opinion on nutritional management strategies for calves covered the nutritional needs of the artificially reared calf from birth to weaning[10], a significant number of which enter the UK's beef growing and finishing stages.

27. FAWC's report on health and disease identified the impact of endemic disease on animal welfare and highlighted the importance of good stockmanship in the prompt identification and treatment of diseased animals; the value of this in preventing spread of communicable diseases within and between herds was emphasised[11]. The report recommended:

- a more proactive approach to cattle disease management;
- more rigorous diagnostic screening for infectious disease;
- use of veterinary advice in preventive herd health planning;

[6] Agriculture in the United Kingdom 2017 (table 3.3)
[7] Farm Business Income by type of farm in England, 2016/17
[8] Report on economics and farm animal welfare, FAWC, 2011
[9] Opinion on the welfare of the dairy cow, FAWC, 2009
[10] Opinion on the welfare implications of nutritional management strategies for artificially-reared calves from birth to weaning, FAWC, 2015
[11] Report on farm animal welfare: health and disease, FAWC, 2012

- better communication and cooperation in the supply chain for the collective benefit of animal health; and
- responsible use of all medicines for long-term sustainability for human and animal health.

28. FAWC stated in its report on stockmanship and farm animal welfare that, of all livestock industries, training provision in the beef sector had developed the least, and it has received no evidence that the situation has changed since[12]. FAWC's Opinion on contingency planning for farm animal welfare highlighted the need for contingency planning in all farmed species in Great Britain, including beef animals[13]. FAWC's advice on space and headroom allowances for transport of farm animals commented on issues concerning the welfare of farm animals, including cattle, during transport[14].

29. EFSA's 2012 Scientific Opinion on the welfare of cattle kept for beef production and welfare in intensive calf farming systems[15] updated two earlier opinions[16]. It identified overstocking, poor ventilation, intensive feeding, lack of dietary fibre, inadequate floor space, mixing of animals and failure of early diagnosis and treatment of disease, as key problems affecting the welfare of beef cattle across the EU.

30. The World Organisation for Animal Health (OIE) sets out basic standards of animal care and has more detailed beef welfare guidance: "Animal Welfare and beef cattle production systems"[17].

3. Overarching issues for all beef production systems

a. General industry issues

31. Farmers and vets based in low livestock density areas reported to FAWC that they had poor access to experienced livestock veterinary services. This can compromise welfare in a number of ways, including prolonged response times to veterinary emergencies, reduced preventive herd health planning due to unfamiliarity of veterinarians with livestock, and inexperience with invasive procedures for cattle.

32. There is a wide variation in how beef farmers make use of veterinary services. While some have regular contact and engage in cooperative, proactive health and efficiency planning, a significant number only seek such advice sporadically. For some, their contact with veterinarians is limited to first-line, reactive services (e.g. for sick animals or calving difficulties) or to obtain prescriptions for and supply of necessary medicines.

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[12] Report on stockmanship and farm animal welfare, FAWC, 2007

[13] Opinion on contingency planning for farm animal welfare in disasters and emergencies, FAWC, 2012

[14] Advice on space and headroom allowances for transport of farm animals, FAWC, 2013

[15] EFSA Panel on Animal Health and Welfare (AHAW); Scientific Opinion on the welfare of cattle kept for beef production and the welfare in intensive calf farming systems. EFSA Journal 2012; 10(5):2669.166 pp.

[16] The risks of poor welfare in intensive calf farming systems, EFSA, 2006

[17] http://www.oie.int/fileadmin/Home/eng/Health_standards/tahc/current/chapitre_aw_beef_catthe.pdf

33. Difficulty in recruiting skilled stockpeople is often mentioned in beef cattle farming circles, due either to a lack of suitable individuals or to inability to afford such labour in units with poor profitability. The ratio of animals to stockpeople may also be increasing and the potential associated risk to cattle welfare has not yet been evaluated. There is also a risk of poorer care of animals needing attention when farmers engage in other employment away from the farm.

34. Some farms are adopting new technologies, partly to 'free up' the time of skilled workers, and to provide them with the tools to meet the needs of individual animals as well as the group. Electronic identification and biosensors, such as rumen boluses (which monitor body temperature and rumen pH), are examples of such 'precision livestock farming' tools beginning to be used.

35. Specialist advisory services, for example the Farm Advisory Service (SAC Consulting) in Scotland, Farming Connect in Wales and privately-operated services, have the capacity to improve animal welfare through preventative health, nutrition and business planning. The uptake of such specialist advisory services has been low in the beef sector largely due to its structurally diverse nature, comprised of a large number of livestock keepers often with small herds.

36. Systems for the objective measurement of health and welfare outcomes – including disease events, regular weighing, body condition scores and mortality – have had relatively poor uptake on farms. Many producers are unaware of their performance and opportunities to improve cattle health, welfare and efficiency.

37. There has been little vertical integration within the beef industry, so animals are often traded and moved between livestock units several times within their life[18]. Trading invariably involves some stress due to associated handling, transportation and the introduction of cattle to a new environment and/or group. Mixing animals increases the risk of disease by the potential exposure of existing or purchased animals to novel infectious agents they may not have previously encountered, and by reducing their immunity due to stress.

38. A recurring theme reported to FAWC has been poor cooperation in the beef supply chain, fuelled by poor communication between producers, processors and retailers, and insufficient long-term planning. Many producers rear animals without a clear strategy for how they are to be marketed. The long lead-in times associated with genetic selection and rearing periods require a clear understanding of retailer and consumer preferences, but these often change without adequate time to adapt. This often results in reduced profitability for producers and low confidence in the market to return a perceived fair return on investment made. This in turn may result in reduced investment in farm infrastructure, training and personnel, potentially leading to poorer animal welfare.

[18] Vernon, M. (2011) Demographics of cattle movements in the United Kingdom. BMC veterinary research 7 (1) p.31

b. Disease

39. The impact of disease on welfare has been previously reviewed by FAWC[19]. There are several infectious agents that have a significant impact on the health of beef cattle, including respiratory viruses and bacteria such as respiratory syncytial virus; *Mycoplasma spp*, bovine viral diarrhoea virus (BVD), bovine herpesvirus 1 (infectious bovine rhinotracheitis or IBR) and *Mycobacterium avium subspecies paratuberculosis* (Johne's disease).

40. Most communicable infectious diseases can be controlled through either vaccination or eradication (diagnosis, treatment/culling and ongoing biosecurity). However, while there are industry schemes to facilitate a structured and robust approach in combating the most prominent diseases (e.g. via the Cattle Health Certification Standards[20]), uptake in England and Wales has to date been poor. There are government BVD eradication programmes in place in Scotland, Wales and Northern Ireland, whilst in England there is a voluntary industry-led scheme[21], working to eliminate BVD from all cattle in England by 2022.

41. Bovine Tuberculosis (bTB) is a significant problem in the beef industry in England, Wales and Northern Ireland. There are notable differences in progress towards control between England and the devolved administrations, with Scotland currently bTB-free.

42. Direct welfare impacts from bTB include the testing process, notably the handling of young and fractious animals. Indirect impacts include the effect that animal movement restrictions may result in a temporary higher stocking rate than the farm's infrastructure and labour can support. bTB is also a limiting factor on the control of other communicable infectious diseases, as statutory culling may result in the purchase of replacement stock (risking disease dissemination), the loss of breeding stock of genetic value, an overall reduction in the number of breeding stock and replacements, and because bTB is demanding of human time and resources.

43. Biosecurity is important to prevent the ingress and transmission of disease to farms (e.g. bTB, IBR, Johne's disease and contagious causes of lameness), but there is considerable variation between farms in how well biosecurity is planned and implemented. It is vital for farms to have a contingency plan, frequently reviewed and updated, that can be enacted should a farm be put under movement restriction and unable to trade for disease reasons.

44. Parasites are a major challenge in beef production: gut and lung worms, fluke, lice and mites are relatively common and there is significant variability at a farm level in how well such parasites are controlled. Climate change is affecting the distribution and epidemiology of parasitic diseases, and viruses spread by insect vectors: for example, Bluetongue and Schmallenberg.

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[19] Report on farm animal welfare: health and disease, FAWC, 2012
[20] https://www.checs.co.uk/
[21] https://bvdfree.org.uk/

45. There is a significant threat to beef animal welfare from parasitic organisms, both external and internal, developing resistance to medicines used to control them.

46. While lameness is not as commonly identified in beef as in dairy cattle, it is still a welfare concern. As beef cattle are often kept on less accessible land, the ability to catch and treat them promptly is reduced, so they may be lame for longer periods before treatment. Even separating out a lame animal, or any that are ill, from a housed pen may be a challenge. The welfare of a small number of animals left untreated for protracted periods is an important issue.

c. Livestock markets and collection centres

47. Although many animals are traded privately and the majority of finished animals are sold directly to abattoirs, livestock markets and collection centres remain an integral part of the beef industry. Around 20% of finished animals and practically all 'store animals' are sold at livestock markets[22]. Many beef farmers depend on markets to determine prices, but there is the possibility of not selling and taking animals back to the farm if the price is too low. Markets also provide opportunities for exchange of knowledge and information. Alternative forms of livestock trading, such as online electronic selling, have failed to flourish to date.

48. Markets and collection centres carry a biosecurity risk as animals from different holdings are brought together, often with lack of transparency on disease status of the farm, the herd and the individual animal. A number of disease assessment and control schemes exist, with a central accreditation body (Cattle Health Certification Standards), but poor uptake means that the industry typically relies on a self-reporting declaration of herd disease status. This has not been fully effective, leading to distrust and lack of knowledge about actual disease status and consequent spread of disease agents, and anthelmintic resistance.

49. Multiple journeys to and from markets and through collection centres add to welfare problems as well as biosecurity risks.

50. An animal's experience at the market can be significantly influenced by the design of the market and the practices carried out by market staff. Risks to welfare at markets include poor handling, inadequate feeding, variable access to water and mixing of groups, added to the stress of transport. Exposure of cattle to novel environments including large numbers of people will also be stressful to stock with little or no experience of this. Young calves are especially vulnerable: the ambient temperature is often not easily controlled which adds to the stress of movement, separation, delayed feeding or different nutrition and risk of exposure to disease from other animals; these stressors can lead to sickness a few days later.

51. It was reported to FAWC that independent inspection of markets by appropriately qualified persons has become less frequent and of shorter duration,

[22] UK Yearbook 2015: Cattle, AHDB Beef and Lamb

increasing the possibility of welfare issues escaping detection without any enforcement action.

d. Housing and handling

52. There has been apparent under-investment in buildings and infrastructure in many farms in the past two to three decades, although there has been some recent investment notably in Scotland. Many units are run in old buildings that are not suited for rearing beef cattle and in which wear and tear may increase the risk of injury. Progress in building design (e.g. ventilation and drainage) and adapting buildings to the changing nature of stock (e.g. animal size) is likely to offer welfare benefits.

53. Good handling systems are critical when working with beef cattle, which by comparison with dairy stock are handled far less frequently. The design and layout of handling systems should encourage natural, safe movement of animals, combined with safety for the operator. Collecting yards should ideally lead into a suitable race, with a wider funnel at the start and a 'sweeping' gate behind, allowing free movement along the race to the handling crush. The latest designs use curves in the race which encourage the animals to move more freely and have boarded sides which prevent outside movements from startling the animals.

54. If cattle are some distance from static handling facilities on the farm they will sometimes need restraint *in situ* for routine or emergency tasks (e.g. assisted calvings or treatment for disease). Without proper facilities, there is a real risk of injury to both animal and operator. Well designed and robust portable handling units are now available, which may overcome the problem.

e. Transportation

55. Transporting animals is stressful for them, and while there is some evidence that cattle may partially adapt to transportation, some stress invariably remains. Stress occurs at the time of animal gathering, during loading, journey and at unloading. The impact of the whole journey on the animal depends on the individual animal's experience and response to these various activities. Disease status, mixing of unfamiliar animals, age and physiological status (e.g. pregnancy) all influence the individual's response to transport whilst the quality of driving and road type will influence the journey experience and risks of trips and falls.

56. It should be noted that animals may have undergone periods without water or feed prior to loading and transport. Journey times are frequently extended due to traffic congestion and this may compound welfare impacts during times of extreme temperatures.

57. Whilst transport legislation requires that animals travel the minimum distance, journey times have increased due to a number of reasons. These include a reduction in the number of markets and abattoirs; producers favouring certain outlets due to real or perceived differences in prices offered; and some retailers insisting on the use of particular abattoirs. This preference might be due to commercial relationships/ownership or other considerations, such as better access to disease

surveillance data, better lairage facilities or improved food security and retailer assurance guarantees, including dedicated on-site cutting and further processing plants.

58. International and intra-community trade involving prolonged journeys, especially those requiring movement over water, brings specific additional welfare challenges in conditions of transport (for example by boat or, less commonly, air) and disease risk. FAWC is mindful that travelling within the UK, notably between islands and the mainland and to and from Northern Ireland, can require similar journeys and produce similar challenges. For example, travel by boat can often incur additional delays due to bad weather.

59. Familiarity of cattle within a group, sympathetic handling at loading and unloading, shorter journey times, too low or too high stocking density and careful driving appear to reduce the risk of injury during transportation. It is believed that transporting horned animals increases the risk of injury to other stock being transported. However, it is unclear how often injuries from horns occur during transportation as there is currently no requirement to record this information.

60. Farmers and transporters are legally required to make a judgement as to whether an animal is fit to be transported for the intended journey. Lame animals (those that are not weight bearing evenly on all four limbs) must not be transported. FAWC received reports of differing approaches by abattoirs as to what was deemed acceptable on arrival. Whilst FAWC was made aware of the increasing difficulty of obtaining on-farm slaughter where an accident has occurred, it remains the case that humane killing to prevent unnecessary suffering is the legal duty of the owner/keeper.

f. Breeding practices

61. Dystocia (calving difficulty) can be a major problem for the cow and her calf, both in the short and long term. Cows suffering from dystocia subsequently have increased susceptibility to metabolic and infectious disease, whilst calves born from difficult births have higher mortality, lower performance and lower health status[23].

62. Double-muscling (resulting from selection for large muscles, especially in the hindquarters) is associated with higher levels of dystocia and Caesarean section. Some breeds express extreme double muscling, which is sometimes encouraged in the show-ring and rewarded at carcass competitions.

63. Under current UK and European animal welfare law, “natural or artificial breeding or breeding procedures which cause, or are likely to cause, suffering or injury to any of the animals concerned, must not be practised”. To avoid calving difficulty it is imperative that the match of the sire to the dam is carefully considered. Using bulls with good predicted genetic ability (Estimated Breeding Values; EBVs)

[23] Arnott, G., Roberts, D., Rooke, J.A., Turner, S.P., Lawrence, A.B. and Rutherford K.M.D. (2012) The importance of the gestation period for welfare of calves: Maternal stressors and difficult births J. Anim. Sci 90:5021-5034

for ease of calving will reduce the risk of dystocia. Similarly, daughters should be kept from bulls with good EBVs for this trait.

64. Introduction of new molecular technology into animal breeding has led to routine genetic evaluation of dairy and some sectors of the UK beef industry, incorporating single nucleotide polymorphism data alongside performance data to produce "genomic breeding values". This technology not only enables faster genetic gain and enables animals to be chosen for breeding from birth, but also is currently the best new technology for selecting animals for "difficult to measure" traits, for example behaviour.

65. This technology is now being used to improve resistance to endemic disease and hence improve health and welfare. It has been possible, for example, to select dairy breeding bulls with improved genetic resistance to bTB since 2016. Defra funded research is underway to determine if such a trait can be developed for beef breeds. The application of this technology depends on reliable data recording and large-scale disease screening of individual animals.

66. Gene editing is a relatively new process whereby more precise modification of the genome can improve host resistance to disease amongst other aspects of animal performance to reduce disease incidence. It is currently not legal to use this technique in routine farm practice, although it is likely to become more widely understood and accepted in the future.

67. There was no evidence presented to FAWC that inbreeding is yet a major issue in beef cattle. The adverse impacts of inbreeding on animal health, risk of congenital defects and welfare are well documented. However, it is up to individual farmers to ensure that mating of close relatives does not occur.

68. The temperament of beef cattle can affect their welfare, especially in relationship to their ability to be moved, restrained or treated without incurring injury. Temperament is a moderately heritable characteristic and docility is one of the individual characteristics included in the UK beef breeding programme.

69. FAWC has commented previously on the possible welfare issues associated with cloning[24]. Commercial cloning, though legal, is not carried out in the EU. There are no controls on the importation of semen or embryos from cloned animals or their offspring.

70. Embryo transfer has been carried out on a small scale with valuable animals for several decades. There are concerns about the implications for animal welfare of the invasive procedures involved, e.g. the use of epidural injections and the multi drug preparation routines, as well as the selection of suitable embryo recipients that should be able to calve normally rather than requiring Caesarean section.

[24] Advice on the cloning of farm animals, FAWC, 2012

g. Fallen stock

71. Services for dealing with fallen stock (animals that need to be killed on farm due to illness, or that have died, which are excluded from human consumption) differ from one area to another in both speed of response and cost. It is important that such animals are dealt with speedily.

72. Animals unfit to travel must be cared for properly while arrangements to kill them humanely on farm are made. If there is an unacceptable delay, the welfare of such stock is likely to be severely compromised. In these circumstances, farmers, stockpeople or veterinary surgeons have a responsibility to kill such affected animals humanely and promptly. Ensuring appropriate stockperson training, availability of suitable equipment and/or access to veterinary services is important for this to occur.

4. Suckled beef breeding animals

a. Background

73. The suckler cow is either a beef cow or a beef cross dairy cow, kept on the farm to breed and rear a calf (or calves) each year for the beef market. The farmer may sell the calf as a "store" animal or "finish" the animal on the farm (rear it to a suitable slaughter weight and conformation). Suckler systems now produce less than 50% of UK beef; in the rest of Europe, suckler cows produce only 30% of beef, and further reduction is likely in the UK.

74. Most suckler herds calve either in the spring or in the autumn, with different accommodation requirements. Nutritional management typically relies on 'weight transfer' in the cow: weight gain in early pregnancy with subsequent loss of body reserves as the calf is suckled. Poor management can increase risks to health from excessive calf weight before birth (e.g. dystocia) or excessive weight loss in the cow.

75. Some suckler cow breeds are better suited to certain production systems (e.g. extensive grass-based), because of behavioural, physiological or other adaptations (e.g. coat characteristics); there may be issues if an inappropriate breed is used for a particular system. For example, most animals selected for high performance require excellent management and tailored nutrition. Failure to provide these can lead to poor body condition and poor welfare.

b. Calving

76. Calving carries a risk to the health and welfare of cattle. Dystocia is relatively common, cited at around 6% of calvings[25]. Failure to assist promptly risks suffering and death of the calf and frequently injures the dam. Regular inspection of stock around the time of calving is therefore important, but this may not occur where animals are kept on poorly accessible land or if farm staff are engaged in other farm activities. This is particularly true with the reduction of available labour on farms.

[25] O'Shaughnessy, J., Mee, J., Doherty, M., Crosson, P., Barrett, D. (2013) Herd health status and management practices on 16 Irish suckler beef farms. Irish veterinary journal 66 (1) p.1

77. Careful use of mechanical aids such as calving jacks to assist birth may be advantageous to welfare, particularly in cases of dystocia. This can increase the ease of delivery, avoid less desirable interventions such as Caesarean section and improve survival rate for calves. However, misuse or uninformed use of such aids is a real threat to the welfare of the calf and dam.

78. Stockperson training and experience in use of calving aids is important. Applied too early, they can cause damage if the cow has not reached the correct stage for delivery. Even at the correct time of labour they can cause injury or death, for example by forcibly attempting a delivery that requires a Caesarean section. Most importantly, traction using powered machinery or vehicles is totally unacceptable.

79. New technology to assist farmers in predicting the onset of calving is already being used in extensive suckler cow herds, such as tail movement / contraction sensors, which should allow earlier intervention in cases of dystocia.

80. Caesarean sections are carried out more often in some breeds and crosses. This major act of veterinary surgery is often carried out in conditions that are far removed from those encountered in an operating theatre. This carries the added risks associated with the difficulties of maintaining surgical sterility, adequate anaesthesia and analgesia and post-surgical control of infection and pain. Inseminating cows with semen from bulls that produce calves most often requiring a Caesarean, or breeding from those cows unable to calve naturally, are therefore unacceptable compromises to welfare.

81. Young females not infrequently conceive to bulls that have escaped confinement, or to their entire male peers if the latter are not separated or castrated early enough. This then requires either early termination of pregnancy or Caesarean section, sometimes in a large number of animals. It can be avoided by basic livestock management and good maintenance of farm buildings and enclosures, i.e. fencing.

c. The breeding bull

82. The breeding bull is an important part of any suckler enterprise, and is still frequently kept and used on dairy farms despite the predominant use of artificial insemination. Bulls have different nutritional and physical needs to female cattle, particularly if housed, but these are often given less consideration than the requirements of the female stock.

83. Purchased bulls benefit from familiarisation and adaption to unfamiliar farm settings, such as concreted yards or cubicles, before commencing work, but frequently this is not undertaken. As a result, many bulls are culled due to musculoskeletal problems[26].

[26] Penny, C. A Survey of the Longevity and Reasons for Culling in UK Beef Stock Bulls. 2001 Cattle Practice 9 (1) p55

84. For many suckler farms, bulls are the only incoming stock. They may be a source of infection, particularly if hired or shared between farms, or may be exposed to diseases in the existing herd. The risk to health and welfare may be reduced by appropriate disease testing prior to purchase and vaccination prior to introduction to the herd and avoiding or minimising the use of shared or hired bulls wherever possible.

85. It is common for bulls to be kept in isolation during some periods of the production cycle. For a herding animal, this is likely to compromise welfare.

d. Housing

86. The principal types of housing for suckler cows, with or without calves at foot, are indoor straw-bedded yards, slats, cubicles and outdoor paddocks.

87. Straw-bedded yards can provide good conditions, providing the straw is generously and frequently spread and of good quality (e.g. wheat, barley) and the cattle are therefore clean and comfortable. Badly managed straw yards result in dirty, wet conditions with poor hygiene.

88. Overstocking on straw yards may result in injury, such as teat treading in suckler cows. Recommended space allowances are variable depending on source and building, with little supporting objective evidence to relate them to welfare outcomes. For example, the recommended bedded space for a 600 kg animal ranges from 4.0 to 6.5 m^2 [27,28].

89. A system that has been observed by FAWC to work well is a generously bedded area for the cows, with feeding and watering areas in a scraped passage or slatted passage to prevent build-up of slurry.

90. Cubicles are popular as the low bedding costs and ease of operation are attractive. Cubicles can be welfare-friendly if they are in good repair, the correct size for the animals, well managed and kept clean. Where farms have changed farming policy the cubicles that were in place and designed for dairy cows are often not of sufficient size for beef cows. It is vital that cows are moved before calving: calving in a cubicle is dangerous as the cow's movement is restricted and she can become trapped; and the free passage of the calf out of the birth canal can be obstructed by the cubicle structure. If the calf is born into the slurry passage, this can represent a serious health and welfare issue. Separate provision for calving is necessary. Calving in cubicles can also present a significant risk to the herdsman attempting to assist the cow, given the danger of being unable to move away freely when the cow moves.

91. Suckler cows are often out-wintered and, although they grow thicker coats, consideration needs to be given to the provision of shelter and infrastructure of any feeding area. FAWC observed that such systems can work well, but that welfare

[27] CIGR Section II - Design Recommendations of Beef Cattle Housing, 2004
[28] RSPCA welfare standards for beef cattle, 2010

could be challenged by lack of shelter, poor ground conditions and poor provision of or access to suitable diet.

92. Cows can be out-wintered on kale or another green crop, with access to feed controlled each day by an electric fence. This can work well on the right type of soil, but it is essential that there is also roughage such as straw to eat, shelter (natural or constructed), and somewhere dry for cows to lie. This type of system can be very challenging in wet weather for both the stockpeople and the livestock.

93. A small number of suckler herds are kept on feed pads. It is vital that these are constructed properly with good drainage. A deep layer of wood-chip or other suitable material should keep the animals dry, clean and comfortable, provided the top layer of chips is suitably fine and topped up regularly, and the system is not overstocked. Management can be a challenge in wet weather and prolonged bad winters. Protection from adverse weather conditions is a legal requirement and so provision of shade, wind break and shelter, if there are no natural ones available, is essential.

94. Fully slatted systems are sometimes used to house adult cattle, typically over the winter period and when they are non-lactating. A high stocking density and unenriched environment typical of fully slatted systems mean that many normal behaviours are limited during the housing period.

95. There is a risk to lactating animals on slats due to teat and tail treading injuries and to any calves at foot when accessing the slatted area from the creep. Fully slatted systems with no bedded area are not legally permitted for calving or for rearing calves.

5. Calves and youngstock

a. Background

96. Looking after youngstock requires particularly good husbandry delivered by qualified, trained and motivated stockpeople, buildings that are fit for the purpose (safe, comfortable shelter with good ventilation) and the correct nutrition.

97. Early life care, including an adequate supply of good quality colostrum straight after birth and continued nutrition, is critical. This is considered in depth in FAWC's Opinion on the Welfare Implications of Nutritional Management Strategies for artificially-reared calves from birth to weaning. Whilst beef suckled calves are not considered, the same principles apply with regard to hygiene at calving and colostrum provision. Ensuring appropriate feeding of colostrum is a particular challenge for dairy-beef rearers, as it is typically not under their direct control. This is especially pertinent for those purchasing low-value dairy bull calves.

98. When calves from different farms, markets or dealers arrive on a new unit, this poses challenges for disease management and biosecurity. A number of units still use prophylactic or metaphylactic antibiotics for risk mitigation. If this method of husbandry is to continue, finding alternative solutions to widespread antibiotic use

without compromising welfare is required, and is already being successfully managed on some farms.

b. Legal mutilations

99. Many beef breeds used in the UK are naturally polled. However, some breeds are horned, as are animals coming from the dairy industry.

100. Disbudding/dehorning is regarded as necessary to prevent injuries to cattle, when fighting, in housing or confinement and during transportation, as well as injuries to people. All methods involve a challenge to animal welfare, but this is a management norm for the majority of units.

101. Caustic disbudding paste, applied to the bud to burn it off over time, can be used legally on calves up to a week old. It is unreliable, as calves may rub it off (as it is an irritant); if they are kept outside, rain may wash the paste down the face, causing irritation or chemical burns; they may also rub it on each other. If insufficient paste remains on the buds, full or deformed, smaller horns will grow.

102. The majority of animals in the UK are disbudded by hot iron cautery or using a sharp scoop followed by thermocautery. Legally, all disbudding must be carried out under local anaesthetic, and there is some evidence to suggest compliance is good. However, the effects are short-lived and calves will undergo a subsequent period of pain[29]. Failure to disbud properly at a young age often requires a greater intervention later, with potential for greater complications and increased suffering.

103. When horns are more developed, they are thought to have greater innervation to the sensory tissue, such that use of local anaesthetic during dehorning may not completely prevent pain. Dehorning older animals is associated with risk of injury to both animals and people during handling. A significant wound is also left after dehorning and sinusitis is a common complication. For these reasons, and because it prevents other injuries from horns from an earlier age, disbudding is strongly preferable from a welfare perspective where there is a clear, identifiable benefit for horn elimination.

104. Castration of male calves is common in UK beef production to reduce both undesirable behaviours between animals (mounting, bullying, fighting), and danger to personnel. Castration, like disbudding/dehorning, can be stressful and painful. Many farmers with access to suitable, safe facilities and end-markets allowing entire animals choose not to castrate their stock. There is no requirement to castrate calves intended for veal production.

105. Castration is achieved by surgical removal of the testes, or by interrupting their blood flow by the application of a Burdizzo clamp or rubber ring. Under UK legislation, rubber rings may only be used under one week old. When animals are castrated over eight weeks of age, this must be done by a veterinary surgeon and an

[29] Stock, M. L., Baldridge, S. L., Griffin, D. and Coetzee, J. F. (2013) Bovine dehorning: assessing pain and providing analgesic management. The Veterinary clinics of North America. Food animal practice 29(1): 103-33

anaesthetic used. There is no mandatory pain relief or anaesthesia required for animals less than eight weeks of age, despite evidence that there is pain associated with these procedures and the existence of suitable licensed analgesics and anaesthetics.

106. It was reported to FAWC during the consultation that it is not uncommon for animals older than the statutory limits to be castrated using bloodless castrators, and that open castration (i.e. using a knife or scalpel) is also being undertaken without the use of adequate anaesthesia. Greater publicity of both these legal requirements is needed, and farm assurance schemes should reflect fully the legal position and the importance of its proper enforcement.

107. There is some evidence that the pain associated with castration increases with age, with animals under one week of age appearing less distressed by the procedure[30].

108. When administering local anaesthetic for disbudding, dehorning or castration, it is imperative that adequate time is allowed for the anaesthetic to take full effect before the procedure begins.

109. Surgical castration carries risks of haemorrhage and post-operative infection, due to poor technique, dirty bedding or flystrike during summer.

110. At present, there are no products available in the EU for the immuno-castration of cattle. FAWC has previously commented on the potential use of immuno-castration in ruminants and the welfare benefits it may afford if shown to be efficacious, painless and safe[31]. True “chemical castration” through injection of toxic substances into the testicle is illegal in the UK.

111. Both castration and disbudding/dehorning depend on a high level of competency by stockpeople. Shortage of skilled stockpeople is again a potential issue in this respect. Training is usually delivered within farm businesses rather than by veterinary surgeons, and bad habits may develop and persist, compromising welfare.

112. There is a large amount of published evidence that calves benefit from longer-term pain relief, such as non-steroidal inflammatory medicines. The use of these medicines for disbudding and dehorning appears to be growing, but is still relatively uncommon, and is almost completely absent for castration. Sedative-anaesthetic agents such as alpha-2 agonists may decrease distress during the procedure and handling, as well as improving safety for both animals and humans, but are infrequently used.

113. Some bulls are castrated in the weeks preceding slaughter. This may be performed to capitalise on premiums offered by processors for castrated males, whilst benefitting from the perceived faster growth rates of entire animals. The risks

[30] Stafford, K.J. and Mellor, D.J. (2005) The welfare significance of the castration of cattle: A review, New Zealand Veterinary Journal, 53:5, 271-278

[31] Report on the implications of castration and tail docking for the welfare of lambs, FAWC, 2008

to welfare are much greater than with earlier castration, including risk of blood loss and death.

c. Weaning

114. Weaning typically refers to the withdrawal of milk feeding. In farmed cattle, this is usually a result of a management decision rather than gradual "natural" weaning, and in suckled animals is also usually accompanied by separation of the dam and calf. Weaning is usually a stressful event for both dam and offspring, especially as it is often combined with other management changes (environmental, nutritional, group) or procedures (vaccination, weighing, routine mutilations).

115. There has been research into methods aimed at reducing distress associated with weaning. Familiarisation with the solid feeds the calf will be weaned onto well in advance of weaning is one method used in suckled cattle via a "creep" system. Other techniques have included weaning using nose plates that allow contact with the dam but an inability to suckle, and separation by a fence-line that allows sight and some physical contact between dam and calf. The degree of stress reduction of these latter two techniques remain contentious however.

d. "Low value" calves

116. The UK dairy industry produces approximately half a million "low value" calves annually. The majority of those born are raised for breeding, milk production or meat. However, this is not the case for all calves as some, particularly male, are considered uneconomic, generally because of high rearing and finishing costs for an animal of low genetic potential, and/or low beef price or market demand for beef derived from that quality and type of animal.

117. In these circumstances, the options are either to kill calves humanely shortly after birth, typically carried out by an external service provider or by the farmer, or to slaughter them for meat (often known as "bobby calves").

118. Increasing and stabilising the value of male calves from the dairy industry could help to maximise their welfare during early life. Farmers are more likely to invest effort and resources in animals when they know that they are destined to be reared as beef animals.

119. Ensuring calf health through good husbandry will both increase welfare and minimise the need for therapeutic antibiotics or other medicines, avoiding the need for meat withholding times before slaughter. Calves with physical deformity, injury or illness likely to cause them distress during movement, transport or lairage cannot legally be transported and should be humanely killed on the farm.

120. Mortality and disease in "low-value" calf rearing systems is typically higher than in comparable beef-bred or dairy-beef units and should be considered a welfare issue. A proportion of this may be attributable to male dairy calves being considered low value animals by some dairy producers, and receiving insufficient colostrum despite the legal obligation for farmers to ensure this occurs within the first six hours of life. Some, however, may be inherent to the organisation of such supply chains, in

particular the sourcing of calves from a large number of farms with different disease exposures.

121. The risk of bovine respiratory disease ("calf pneumonia") in particular is often high in "low value" calf units. Again, this is likely due to poor immune status from low levels of colostrum intake and sourcing animals from multiple holdings, but in many cases is worsened by deficiencies in building design. Use of prophylactic or metaphylactic antibiotics is reportedly common in controlling disease, but it increases the risk of antibiotic resistant organisms and endangers the ability to treat animals effectively in the long term. Equally, the reliance on vaccines to support such husbandry systems should not be seen as an acceptable substitute.

e. Veal

122. Veal units are uncommon in the UK, with limited market demand. Those that exist typically use a straw-based, high welfare system of production and are linked to large retailer initiatives or niche supply chains. While the welfare of veal animals in the UK is generally good, there are still considerable health and welfare challenges associated with multiple sourcing of calves for the units.

123. There is a high incidence of digestive diseases, particularly bloat and abomasitis, in veal animals. Understanding of the aetiology of these diseases is poor, but it is likely that feeding practices (e.g. unrestricted access to milk) contribute to other known risk factors.

6. Rearing and finishing systems

124. "Finishing unit" is a broad term encompassing all farms that rear stock to the point of slaughter. These include:

- Bull beef units, which rear beef-bred or dairy-bred entire males to slaughter at 12 to 15 months old;
- "Standard" finishing units, which take non-breeding females and castrated males to slaughter, typically at around two years of age; and
- Grass-based finishing units, which typically take late-maturing breeds to slaughter at around 30 months of age.

125. Bull beef and standard finishing typically involve feeding a nutrient rich diet for 3 to 4 months prior to slaughter to enhance carcass yield and conformation.

a. Housing

126. Conventional rearing and finishing beef systems use a wide variety of accommodation types, including paddock grazing and overwintering, housed straw yards, slatted systems and "hybrid" systems (straw yard with slatted feeding or loafing area). Cubicle housing is rare. Finishing is normally carried out indoors, but some farms provide outdoor access for feeding or loafing. The way in which cattle are accommodated has important effects on production efficiency, health and welfare.

127. Good ventilation and drainage are essential for animal health and general wellbeing. Modern facilities ensure good air-flow with no harmful draughts for young stock (in particular) but can be cold for very young animals. Many farms, however, have old buildings which often have inadequate ventilation and drainage and are unsuited to modern production methods.

128. Regardless of housing system, high stocking rate increases risk of disease transmission, particularly of bovine respiratory disease and especially in young stock. Pneumonia is a significant threat for many units[32].

129. For housed stock, space allowances under 4.7 m^2 for animals 250 - 500kg in weight have been associated with poorer performance and likely compromise to welfare, with the most significant compromises at under 2.0 m^2 [33]. Such space allowances fail to take account of behavioural needs.

130. Straw yards are similar to those used for suckler cows: a deep layer of straw over a concrete or free-draining base, topped up over a few weeks, then cleared out and re-bedded. Straw yards typically offer a high level of comfort and perform well in preference testing. Where palatable wheat, barley or oat straw is used, they also add additional long fibre to the diet, beneficial for rumen health. Straw yards are not suitable for high stocking density. If over-stocked, injuries may occur by animals treading on each other and the bedding is likely to become wet and dirty, especially if topping up is inadequate.

131. Slatted floors were introduced in the 1970s, with each slat cast individually, so they could move relative to each other. Whilst many units still have these in place, modern slats are cast in sections, providing a more rigid floor and potentially reducing injuries. Rubber coated slats are designed to provide more grip and greater comfort than concrete slats.

132. The finishing of beef cattle on fully slatted systems is increasing. Such systems usually have high stocking rate (necessary to ensure manure is trodden through the slats), nutrition designed to achieve rapid liveweight gain, no bedding costs, low labour costs and good economic performance. However, while all animals are theoretically able to lie down at the same time and access to feed is typically good, there are severe limitations on expression of normal behaviour. These include difficulties in standing and lying transitions (due to low lunging space, slippery conditions underfoot and hard surfaces), lack of freedom to explore or exercise and inability to move away from dominant or aggressive groupmates.

133. Compared to bedded pens, concrete slats provide less lying comfort (behavioural indicators include long lying bouts, caused by reluctance to lie down and stand up), rank low in preference testing and cause more chronic and acute leg

[32] Gorden, P. J. and Plummer, P. (2010) Control, Management, and Prevention of Bovine Respiratory Disease in Dairy Calves and Cows. Veterinary Clinics of North America: Food Animal Practice vol. 26 (2) p. 243-259

[33] Ingvartsen, K.L. and Andersen, H.R. (1993) Space Allowance and Type of Housing for Growing Cattle: A Review of Performance and Possible Relation to Neuroendocrine Function

lesions and injuries. There is some evidence that rubber- or plastic-coated slats may be more comfortable than concrete slats but still less comfortable than straw yards, although there have been few published controlled comparisons between these systems.

134. There are problems on slats with sexual activity (riding) in bulls. FAWC was presented with example evidence of the use of wires or hawsers, which could be electrified, to deter riding behaviour. Whilst this may prevent injury, it clearly compromises normal behaviour and no system of production should be designed around the need for such aversion techniques.

135. Diets predisposing to loose dung cause problems on slats: if slats are covered with slurry and the cattle become dirty, clipping prior to slaughter may be necessary. However, few hygiene problems are seen if a correct diet is provided.

136. While tethered or tie-stall systems are not common in the UK, these systems severely restrict normal animal behaviour unless just used for very short periods whilst husbandry procedures are being undertaken (e.g. cleaning of housing).

137. Straw corrals, large outdoor pens constructed with big-bale straw walls, can be very effective in low rainfall areas. With generous straw bedding the animals can express normal behaviour better than in systems without bedding. Good drainage and shelter are needed to provide a dry place for cattle to lie.

138. A number of farmers use outdoor corrals for finishing with a “pad” of bedding. The pad needs a comprehensive drainage system to keep the base dry. The bedding, for example woodchip, needs to be deep and evenly spread if the cattle are to be comfortable and dry. There can be problems in extreme weather, with cattle having no shelter or dry lying space, and needing shade if in direct sunlight.

139. Whilst most rearing systems include grazing for a large portion of the year, most animals are not finished on grass and therefore require supplementary feeding to meet desired market specifications. This is often done whilst animals are housed. The length of time needed for finishing varies enormously due to geographical location (e.g. effect of topography and climate on grass growth), stage of animal growth, feed quality and quantity, genotype, health status, stockmanship skills, access to water, and other housing and management factors. Whilst welfare in grazing systems is often very good, this will only be true if animals are protected from extreme weather by shade and shelter, and mud patches especially at watering points and gateways are minimised.

140. Keeping cattle in inappropriate conditions risks them becoming dirty, with mud or faeces built up within their coats. Aside from indicating that animals have been kept in unsanitary conditions, matting of the coat with dung reduces thermal insulation and indicates their welfare has been compromised.

141. Animals must be clean before entering the slaughter line, effectively requiring clipping of live animals on the farm or in lairage if dirty. This is a stressful procedure that carries risk of injury to both animals and personnel. In some places, clipping takes place after slaughter, eliminating this cause of stress.

b. Diet

142. Ruminants have evolved to obtain energy from slow fermentation of fibrous plant-based carbohydrates, and diets deviating substantially from this endanger the complex microbiology of the rumen. In such cases ruminal “acidosis” may occur, with subsequent damage to the gut lining and absorption of bacteria and toxic metabolites into the bloodstream. Rumen acidosis in finishing beef systems is a common problem leading to poor animal health and reduced productivity.

143. There are significant challenges to rapid finishing without compromising health. Finishing diets with high energy and protein levels are typically based on cereals and other concentrated feeds with relatively little forage. Where ensiled grass and especially maize is the principal forage source, some additional long fibre such as chopped straw is needed to maintain rumen health.

144. Low fibre diets and those that compromise rumen health (typically those high in fermentable sugars, starches or acids) may also cause loose dung or diarrhoea. This reduces environmental hygiene, particularly in some types of housing (e.g. slats), decreases cleanliness of animals and increases bacterial challenge.

145. If dietary changes are gradual, feeding is well managed and cattle comfort good, adaptation is possible to relatively ‘extreme’ diets. Even so, diets with less than 25% of “neutral detergent fibre” by dry matter basis (long chain structural carbohydrates including cellulose, hemicellulose and lignin) or with a low proportion of long fibre (<7% by dry matter) are considered high risk.

146. Rumen boluses are available that transmit information on rumen pH electronically. Although not a substitute for good management, they may provide valuable information as an additional tool to monitor gut health in finishing beef animal systems and can be used to guide the formulation of the optimal diet for the animal.

147. By-products of human food and animal feed processing are often incorporated into cattle finishing diets, mainly because of local availability and low cost. By-products may be variable in quality and composition, making it difficult to balance the diet and challenging for rumen health.

148. Rumen health is at higher risk of compromise in certain systems, particularly slats, where farmers may be reluctant to provide long fibre in the diet to avoid the consequent effect of the faeces clogging the slats and stalling the underfloor slurry flow.

7. Ethical analysis

149. From an ethical perspective, beef production cannot be separated from dairy production. Every bull calf and heifer not selected for dairy production, born to a dairy cow, is potentially a veal or beef animal. In herd animals normal behaviour needs to be considered at the group level as well as at the individual level.

150. All farmed animals deserve a life worth living. It is ethically questionable to humanely kill viable calves shortly after birth before they have had this opportunity. Methods to reduce the number of such calves born (for example by using sexed semen), or to increase the number reared, would be advantageous. Some retailers have introduced requirements on their rearers to address this issue.

151. The highest ethical standard for calf rearing is the suckler herd, in which both the cow and her calf or calves have the potential of a good life. The bond between calves and their mothers is preserved, and calves can be weaned naturally. Provided basic welfare needs are met, a good life is promoted by extensive rearing with either the provision of shelter or indoor housing and feed provided in winter.

152. No mutilation of cattle is justified unless the benefits outweigh the harms, the harms to welfare are minimised and the benefits cannot be obtained by other methods, such as breed selection and herd management. Where mutilations that are either painful or give rise to subsequent pain are carried out for management purposes, anaesthesia and pain relief should be administered for the period that such pain or discomfort is exhibited or likely to be experienced.

153. If cattle are reared or finished using feeding systems designed to maximise their growth rates, from an ethical perspective this should not involve a compromise to their nutritional or metabolic health; i.e. their welfare should not be adversely affected for economic return.

154. Selection for double muscling is harming welfare in some breeds as it leads to a higher proportion of difficult births and routine Caesarean section. FAWC has previously emphasised that Caesarean births are not part of normal animal behaviour and restates this here[34]. Cattle should not be bred such that their welfare requires increased human intervention, partly because provision of this cannot be assured in all circumstances.

155. To minimise the stress associated with prolonged transport times, cattle should be slaughtered close to their place of rearing. In addition, owners have an ethical responsibility to pass on cattle only if they can reasonably expect that their future welfare needs will be met. For both reasons, long distance transport and the export (and import) of live animals to remote units is problematic.

8. Critical issues

156. The Code of Recommendations for the Welfare of Livestock: Cattle, published in 2003 for England, requires review and updating to reflect contemporary welfare regulation and science. Such Codes should be reviewed regularly.

157. The profitability of many beef farms has been low (and in many cases, negative) for some years, despite CAP payment from the EU. This has resulted in low investment in farm infrastructure and training, loss of skilled labour, limited use of

[34] Opinion on the welfare implications of breeding and breeding technologies in commercial livestock agriculture, FAWC, 2012

modern production and veterinary techniques, and therefore a risk of poorer animal health and welfare. It is likely that low profitability and multiple trading are interlinked.

158. The beef industry is very fragmented. This promotes added risk to livestock welfare from being transported several times during their lives, and thereby from the stress of transport, repeated social disruption and the inherent disease challenges associated with mixing animals from different sources.

159. Importing beef from systems with lower welfare standards than those in the UK potentially puts domestic producers at a competitive disadvantage, and may result in a net global reduction in animal welfare.

160. Reduced availability of skilled labour threatens cattle welfare through less vigilant stockmanship and inexperience in certain husbandry procedures. In some instances, the use of new technology that monitors animal health and reproduction can negate the issue of staff shortage or low skill level but it should not be relied upon and may require a particular new skill to apply it to best effect as well as requiring backup systems lest it fail to function properly.

161. Low adoption of whole life farm assurance may threaten access to future international markets and reduce domestic confidence in such schemes.

162. Compared to the pig, poultry and dairy industries, the beef industry has generally been slow in adopting specialist advice and technical resources to improve health and productivity.

163. Many farmers are unaware of their herd's disease status. This, and particularly if combined with poor biosecurity, increases the risk of regular dissemination of disease through private sale, collection centres and livestock markets.

164. The ability to treat bacterial and parasitic diseases is threatened by the development of resistance to drugs typically used in their control. Systems of rearing reliant on the use of such medicines are unsustainable.

165. Whilst markets offer a valuable service to farmers, there is variation in how well the stress of such environments on cattle is managed, and in their ability consistently to deliver a high standard of welfare. Reduced inspection by appropriately qualified persons will compromise the detection and prevention of health and welfare issues.

166. Transport time to slaughter can be prolonged by the contractual requirement of the use of dedicated retailer abattoirs and by the reduced number and geographical distribution of abattoirs.

167. Breeding decisions for cattle do not always take welfare into account. The genetic tools for appropriate selection are often misunderstood and are under-utilised.

168. The local climate and availability of resources such as buildings, straw and labour determine the appropriateness of different production systems and their ability to deliver good welfare. Indoor and outdoor systems vary in their impacts on welfare; some are inherently more challenging or higher risk and may be inappropriately adopted. For example, outdoor systems developed in low rainfall areas can give rise to considerable welfare issues if used in high rainfall areas without adaptation to that different climate or may be unacceptable as adaptation is not possible.

169. Fully slatted rearing and finishing systems can deliver good animal performance, but fail to meet adequate welfare standards due to the need for high stocking density, limitations on normal behaviour, reduced physical comfort and increased risk of both chronic and acute injury.

170. Ruminal acidosis is common during intensive finishing, affecting both welfare and performance and requires a high level of stockmanship to manage.

171. Animals kept in unsanitary conditions result in unclean, manure-contaminated stock that not only are at greater risk of disease and have poorer thermoregulatory control, but also are an increased public health risk when presented for slaughter. A common consequence of dirty cattle, presented for slaughter, is that they require additional handling for clipping, which poses an additional stress and risk of injury for both the cattle and those attempting to carry out the procedure.

172. Access to treatment for sick and injured animals on farm can be challenging, particularly in extensive systems and can give rise to unacceptable delay in diagnosis and treatment.

173. A significant number of lame cows are kept on farms for protracted periods in the hope that they will one day be fit for transportation to slaughter. There is still a ‘grey area’ in the understanding as to what constitutes fitness for transport and this is exploited by some at the expense of animal welfare and can encourage illegal activity. There is a tension between prompt transport to slaughter with subsequent end to suffering and preventing lame animals being unacceptably retained on farm.

174. Colostrum provision and nutrition for calves are frequently inadequate, especially in “low value” dairy bull calves in early life. Hygiene at calving and ensuring the right colostrum in the right amount at the right time is just as important in beef suckled calves as in the dairy sector. Once-daily milk feeding of calves less than 4 weeks of age is illegal but still occurs.

175. Castration and disbudding/dehorning remain commonplace, and there has been slow adoption of alternative solutions such as the breeding of polled animals. The procedures are frequently carried out later than is desirable, occasionally by people lacking adequate training, and often with less pain relief than is appropriate and even legally mandated. Too many animals fail to be disbudded at the correct time and have to suffer the risks of later dehorning.

176. Few marketing opportunities currently exist for “low value”, male dairy calves, and as a result many are killed shortly after birth. There is potential for a compromise in standards of care for such “low value” animals.

9. Recommendations

a. General industry issues affecting the welfare of beef cattle

177. All members of the supply chain should improve communication, with a long-term strategy for cattle specification. More strategic relationships should be developed within the chain to help ensure that farmers have a secure market for their product so that the beef supply chain is shortened.

178. To ensure that the welfare of stock is not compromised by financial inability to maintain or redevelop infrastructure, beef farmers should develop a long-term business plan with sensitivity analysis to allow for different market/pricing eventualities. This should be used to formulate a farm investment plan for buildings, handling facilities and labour. External consultation with relevant advisory services (e.g. farm business consultants, veterinarians, extension agencies, financial services) is advisable when creating a plan.

179. To maintain and promote good welfare, providers of farm assurance schemes, retailers and food service providers selling products labelled under such schemes should adopt whole life assurance for beef animals from calf to finished animal at slaughter.

180. The Code of Recommendations for the Welfare of Livestock: Cattle, published in 2003 for England, should be reviewed and updated as a priority, to reflect contemporary welfare regulation and science, and consideration should be given as to thereafter reviewing on a more frequent basis.

181. Processors, retailers and food service businesses should only import beef products from countries which meet or exceed UK standards of cattle welfare, food safety and traceability.

182. Industry should work with Government to assess the extent of any deficit of access to skilled stockpeople and front-line veterinary services, particularly in low livestock density regions, to ensure that animal welfare is not compromised.

183. Industry should work with Government to understand the impact on animal welfare of increasing stock to stockman ratio and of part time farming, especially where the employment takes the farmer off-farm; this should extend beyond the beef industry.

184. Increased emphasis should be placed on recognising the importance of health planning and a wider investment encouraged in education and training for beef production systems.

185. Farm assurance schemes should require that stockpeople are formally trained, and certified as such, by an appropriately qualified person who is competent

in the application of procedures that directly impact on welfare, such as use of calving jacks, castration, disbudding and ear-tagging.

186. There should be further investment in welfare-related research by all stakeholders in animal health and welfare including the Government. Research should be relevant to current and future needs. This includes, but is not restricted to:

- Building design (flooring, ventilation, stocking density)
- Breeding for disease resistance (lameness, parasites, mastitis, BVD)
- Use of new technology (e.g. gene editing, sensor technologies) to improve animal welfare
- Nutritional management particularly to reduce abomasal ulceration and bloat in calves
- Feeding/nutrition of finishing animals and gastro-intestinal health
- Survey of the state of existing current farm stock buildings in the UK

187. Given the push towards improving feed efficiency and reducing methane emissions from beef cattle, there is a need for research on the interactions between welfare, efficiency and methane emissions (to understand both how welfare will be affected by this drive towards efficiency, and how better welfare might affect efficiency in its own right).

b. Disease

188. The development and adoption of farming systems dependent on the use of antimicrobials or anthelmintics to maintain animal health and welfare should be avoided by farmers or vertically-integrated supply chains. Existing systems with a high proportion of animals receiving antimicrobials must have a clear strategy on how to reduce reliance on such drugs without compromising welfare. If that cannot be achieved then such systems should not continue.

189. The industry should move towards full disclosure of major communicable disease status of all cattle at the point of sale, both private and at market.

190. The industry should prioritise introduction of a national disease data-hub allowing real-time access to herd disease status.

191. Farmers not currently monitoring cattle health outcomes and production efficiency objectively should consider adopting recording and reporting systems that provide such information.

192. National surveillance schemes should continue to receive funding to characterise changes in infectious and parasitic disease incidence and distribution and susceptibility to treatment/resistance, including emerging or novel diseases. Collaboration between public and private laboratories should continue to develop to support such surveillance.

193. Further research into practical approaches to reduce the rate of anthelmintic resistance development should continue to be a funding priority. Current best practice should continue to be disseminated to farmers by knowledge-transfer

organisations such as the Agriculture and Horticulture Development Board and equivalent bodies in Wales and Scotland. Those supplying such medicines should be capable of advising on appropriate handling, storage, dosing and monitoring strategies and be required to do so at each sale.

194. Conditions likely to be associated with pain or discomfort should receive appropriate pain relief. Where there is uncertainty, animals should be given the benefit of the doubt and pain relief instituted.

c. Transport and markets

195. Farmers should transport animals the minimum distance to slaughter or market, unless there are clear net welfare benefits from using a more distant abattoir.

196. Further research should be undertaken by industry and supported by Government into the welfare impacts of journey times on beef cattle. This could be extended to include the evaluation of environmentally controlled trailers for beef cattle. Until there is a better understanding, total journey length for live cattle should be minimised.

197. Industry should work with local authorities to develop contingencies to deal with unforeseen circumstances resulting in animals being confined in transport for long periods, such as may occur through abattoir breakdowns, traffic congestion or delayed sea travel.

198. Farm assurance, processor and retailer/food services schemes should support current initiatives to minimise the number of movements between distinct holdings in an animal's lifetime. FAWC recommends an initial target of two movements for suckler born and three for dairy born animals, excluding transport to slaughter.

199. Livestock markets should consult cattle behaviour experts and other recently upgraded markets at an early stage of planning infrastructure improvements, to ensure that facilities take into account the behaviour of cattle.

200. Market inspections by appropriately qualified persons should be increased in duration and frequency, with the appropriate allocation of resources to do so.

201. Veterinary advice must be sought by farmers where there is any doubt over fitness of cattle to travel on any journey, in line with current legal requirements. Increased clarity between farmers, transporters, markets and abattoirs over what is acceptable is needed, especially in the case of cull cow lameness. The Food Standards Agency, Animal and Plant Health Agency and local authorities should continue to work with industry to achieve common agreed standards on acceptability of differing levels of mobility.

202. Where animals are considered unfit for transport, farmers must seek guidance on their prognosis and, where this is poor, animals must be humanely killed at the earliest opportunity.

d. Breeding animals

203. Breeding companies should incorporate a broader range of breeding goals, such as disease resistance, aspects of fitness and functionality (e.g. mobility) into their breeding programmes, alongside those of productivity.

204. Breeding companies should include more data from commercial farms in their genetic evaluations, to improve their accuracy, and provide beef farmers with the opportunity to match animals to their rearing environment. Such data could improve welfare, for example, in improving ease of calving by identifying bulls yielding offspring with a lower risk of assisted births. Measuring aspects of animal temperament, for their inclusion in breeding programmes, will lead to selection for calmer animals.

205. Breeding companies should work with farmers, vets and abattoirs to ensure that health traits are recorded and reported in a standardised manner to facilitate and maximise their value in breeding programmes.

206. It is already a legal requirement that cows must not be mated to bulls where a Caesarean birth is the most likely outcome. This should be extended to cover surrogate dams carrying implanted embryos. Cows that have already had two Caesareans should be regarded as being unsuitable for further breeding and culled.

207. To provide objective, unbiased and reliable data for Estimated Breeding Value generation, breed societies should make it compulsory under membership rules that Caesareans are recorded on their pedigree register, that Caesareans of recipient embryo transfer cows from donor animals are included in the pedigree register and that this information is openly available to purchasers.

208. Farmers should ensure breeding bulls are isolated only for the requirements of biosecurity or disease screening. At all other times bulls should be kept with other stock, provided safety can be maintained, and at least in sight of other cattle.

e. Housing

209. FAWC recommends that fully slatted systems should be phased out of UK production. Existing slatted systems should be provided with bedded lying areas where possible. Where that is not possible, concrete slats should be covered with slip-resistant rubber or plastic to increase comfort, and the time for which animals are kept wholly on slats should be minimised.

210. Farmers and advisers on building design should be better informed on the legal requirements of cow needs at calving and calf needs from birth up to the age of six months, i.e. calves cannot be born on slats in the UK and must have access to a fully bedded area. Cows due to calve should be moved at least three weeks before the predicted calving date, either to straw yards or grass, to ensure farmers comply with current regulations on calving requirements for all cattle and for confined (housed) calf access to bedding.

211. Cattle should not be near-permanently tethered or kept in tie-stalls; this should be specified in farm assurance schemes and considered for statutory regulation by UK governments.

212. Farmers should rear cattle in environments that ensure they are clean when presented for slaughter, in line with current FSA guidance on Clean Livestock Policy[35]. The aim should be that cattle remain clean throughout their lives and not just at the time of presentation for slaughter.

f. Calves

213. In line with current legislation, "uneconomic" or unviable calves must be humanely killed immediately or reared with as much care for welfare as any other calf until the point of death.

214. Whilst FAWC welcomes the current initiatives regarding market development being made by the supply chain regarding low value calves, further development as an alternative to slaughter at birth (e.g. rose bull beef) should be explored and encouraged. Assurance schemes will need to provide strict and auditable requirements to ensure that the welfare of such calves is not compromised.

215. Veal production and consumption in the UK should be recognised as being based on systems that allow dairy bull calves to have a life worth living, and even a good life, and promoted as an alternative to killing "low value" but biologically viable calves. Producers, processors, retailers and supporting organisations (e.g. the Agriculture and Horticulture Development Board) should maintain efforts to create and expand such markets.

216. Assurance schemes should consider terms preventing trade in horned stock over eight weeks of age, and uncastrated males over eight weeks of age, unless for breeding purposes or finishing as bull beef. Dehorning (removal of fully grown horns) should be prohibited within such schemes apart from where there is a clear immediate welfare benefit (for example removal of in-growing horns).

217. Where suitable facilities and end-markets allow, keeping animals entire is preferable. For buyers and retailers of beef, consideration should be given to the welfare consequences of sudden changes in product specification, such as the exclusion of young bulls and resultant castration of mature animals. Should a mutilation be necessary, then it should be for the benefit of the animal and not for the economic benefit of the rearer or retailer.

218. If immuno-castration can be developed to be efficacious, painless, safe and practical in a commercial farming environment, it should be supported by members of the beef supply chain as an alternative to other methods of castration.

[35] https://www.food.gov.uk/business-guidance/cleaner-cattle-and-sheep

219. Mandatory pain relief by (local) anaesthesia or analgesic agent should be extended to all animals, regardless of age, for castration.

220. To reduce the pain associated with castration, disbudding and dehorning that is known to extend beyond the immediate pain block provided by local anaesthesia, additional pain relief should be provided. Fractious animals should also receive appropriate sedation prior to surgery.

221. A date should be set for the phasing out of the use of caustic paste as a method of disbudding.

222. Greater awareness and better policing (including by assurance schemes) of the current statutory requirements for mutilations is essential.

223. Breeding companies should prioritise the breeding of polled dairy and beef sires of good genetic merit; gene editing technology could accelerate this process. Farmers should increase use of polled animals in breeding programmes where possible.

g. Feeding and nutrition

224. Producers should take care to avoid excessive “weight transfer”, caused by feeding the beef suckler cow inadequately during the weeks after calving, so that she loses body weight while feeding the calf. They should avoid loss of more than 0.75 UK Body Condition Score units within two months after calving. Beef suckler cows should be managed to ensure that their Body Condition Score does not fall below 2 or exceed 3.75.

225. Specialist and experienced advice should be sought for finishing rations, particularly where by-products are utilised and the potential for frequent dietary changes are likely to be made and would be best avoided. The importance of nutrition to the welfare of beef animals lends weight to the further development of a nutritional-advisory certification body which should be supported by industry.

10. Glossary

Bobby calf: a low value dairy-bred calf which is killed or slaughtered shortly after birth for meat, principally because further rearing is judged uneconomic.

Body Condition Score: a method of estimating the amount of body fat carried by an animal by assessing certain visual and physically palpable criteria at set comparison points.

Calf: under welfare law, a bovine animal up to six months of age.

Creep: an area only accessible to calves, used to provide supplementary feed and/or refuge, including bedding if not available elsewhere.

Disbudding: the physical or chemical elimination of the developing horns, typically referring to small horn tissue growths and horns up to 2-3 cm in length. This can only be performed by a trained and competent person over the age of 18 in the UK, requires a local anaesthetic and continued pain relief is recommended afterwards.

Dehorning: the removal of horns where complete elimination of germinal issue is unlikely, typically greater than 3 cm in length and including mature, full length horns. This must be performed by a veterinary surgeon in the UK as dehorning requires entry into a body cavity and is not exempted for anyone other than a veterinary surgeon to perform under current UK law. Local anaesthetic must be used and prolonged pain relief afterwards recommended.

Dystocia: difficulty in calving that may necessitate human intervention or assistance.

Embryo transfer: the process of harvesting embryos from an animal of genetic merit and transferring them to a lower merit animal, to increase the number of offspring from the donor, or to allow breeding from an animal having difficulty establishing or maintaining pregnancy.

Estimated breeding value (EBV): an estimate of the genetic propensity of an animal to pass on to its offspring a number of desirable characteristics. EBVs include measures of growth and calving attributes.

Finishing: the final stage of the rearing process to reach the desired body condition for slaughter that is most likely to achieve the required market or contracted for, carcass evaluation. In intensive systems of rearing it is characterised by a short period of intense nutritional management to promote the rapid laying down of muscle and fat.

Fully slatted system: a housing system with all under-foot and lying areas as slats, typically reliant on high stocking density to facilitate manure removal. This is not legally permitted in the UK for calves or calving cows.

“Low value” calf: an animal whose genetic propensity for muscular growth and/or feed efficiency is sufficiently low that it is unprofitable to rear them for beef. Which

animals qualify as “low value” at any point is therefore dependant on both market demand (price) for beef and rearing costs (especially feed).

Partially slatted system: a housing system in which a non-slatted lying area is offered, but which incorporates some use of slats for manure removal in feeding and/or loafing areas.

Rearer: a beef enterprise that typically takes calves from weaning to the start of finishing. Rearing may be combined with other enterprises such as suckler systems or finishing systems.

Store animal: an animal, at any stage of life after weaning, that has not reached its accepted slaughter specification.

Suckler (cow): a cow that is kept to feed its own or other young. Calves usually suckle the cow for around 9 to 10 months before being weaned. Beef suckler cows typically calve either in early spring or early autumn.

Appendix 1 – FAWC Membership, 2018

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Appendix 2 – Those who gave evidence and assistance

We would like to thank the following organisations for providing evidence and assistance:

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British Cattle Veterinary Association
British Veterinary Association
British Veterinary Association Scottish and Welsh branches
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Dunbia
Farmers' Union of Wales
Lincoln Red Cattle Society
Livestock Auctioneers Association
Maesyglyn Farms
Meat Promotion Wales
National Beef Association
National Farmers Union
National Farmers Union Cymru
Red Tractor Assurance
Royal Veterinary College
RSPCA
SAC Consulting
Sainsbury's
Scotland's Rural College (SRUC)
Trading Standards Institute
Waitrose