



## Module 8

# Disease and Production Measures of Animal Welfare

## Student Activities

### Questions

**1. Both disease and production can impact upon animal welfare in terms of functioning and feeling. Using examples, explain five ways through which disease, production and welfare are interrelated?**

**(5 marks)**

- Disruption of physical function by disease or excessive production creates negative sensory input from the associated tissue damage and/or metabolic changes, etc.
- The brain evaluates this input, and this can give rise to negative feelings such as pain and weakness, and negative emotions such as fear secondary to the pain or weakness.
- These feelings and emotions can in turn can affect animals' appetite, body weight, fluid balance, etc.
- If those physical effects continue, the underlying disease or production demand may have further adverse effects (e.g. because lack of food intake starts to compromise immunity), creating more negative feelings and resulting in suffering.
- Even when production demands are not excessive, the presence of disease can reduce animals' production, e.g. by slowing their growth rate.

**2. Rather than simply altering an animal's physical functioning, disease and production can adversely affect welfare in a variety of ways. Using the framework of the Five Freedoms, explain how each may be compromised directly or indirectly by over-productivity or the presence of disease.**

**(5 marks)**

An animal that has a painful disease or is weakened because of production fatigue may not be able to compete with other animals for food and water, or for a warm lying area. So, the first two Freedoms on the list are not satisfied.

The third Freedom is not satisfied because they have a disease or metabolic compromise; each of these can predispose an animal to the other. Moreover, the resulting weakness or

pain are likely to interfere with the fourth Freedom – the expression of normal behaviour. This is because they will attempt to avoid further injury, and perhaps become dull and inactive, not being in a state to perform all the behaviours that might otherwise be important to them (e.g. rooting in pigs, social behaviour in dogs). All of these aspects may in turn cause distress and fear – breaching the fifth Freedom.

- 3. Disease can threaten welfare by causing the animal to experience pain and discomfort. Explain two changes you would expect to see in the behaviour of an animal that is in pain.**

**(2 marks)**

A diseased animal that is in pain may become immobile or hyperactive, possibly paying increased attention to specific areas of its body affected by the disease, and may demonstrate a decreased tendency to engage in social feeding behaviour. A diseased animal may also be in pain, however, without demonstrating such behavioural changes.

- 4. Many diseases will be accompanied by the experience of pain and discomfort. Name and briefly describe the four main elements of pain processing that constitute the pain pathway.**

**(4 marks)**

1. SIGNAL TRANSDUCTION: noxious chemical, mechanical or thermal stimulus.
2. IMPULSE CONDUCTION: the nerve impulse is conducted to the spinal cord.
3. TRANSMISSION & MODULATION: in the spinal cord, the signal is modified and transmitted to the brain.
4. PAIN PERCEPTION: the signal is perceived in the brain.

- 5. Surveys on how veterinarians use analgesia and anaesthesia suggest that some veterinarians view both as having pain-relieving properties. Does anaesthesia prevent the pain pathway from being activated?**

**(1 mark)**

Anaesthesia only blocks pain perception by the brain. Nociceptors and the rest of the pain pathway continue to be stimulated.

- 6. When pain is not recognised or managed effectively, it can lead to further complications such as allodynia or hyperalgesia. Describe each of these conditions. (2 marks)**

Painful conditions that are not treated can cause the pain pathway to become very sensitive. This can result in heightened perception of existing pain, which is known as 'hyperalgesia'. 'Allodynia' is caused when pain is not treated and stimuli that normally would not cause any pain become painful. For example, lightly touching the animal's skin may be extremely painful. Allodynia may persist even when the underlying source of the pain has been treated.

- 7. Describe how genetic selection for high production is associated with negative effects on welfare for laying hens and dairy cows. (4 marks)**

- Laying hens can suffer from osteoporosis, which is a decrease in bone mineralisation that predisposes the birds to fractures. Osteoporosis is thought to result from the genetic selection of birds for high rates of lay, such that too much calcium has to be mobilised from the bones. If the birds are handled roughly during transport and slaughter, many of them may suffer broken legs and wings, which cause pain and suffering.
- Dairy cows can suffer from metabolic exhaustion, which is partly caused by their genetic potential for high milk production. Their bodies naturally produce very large amounts of milk, because of their genetics; however, their conversion of dietary intake into milk components has not become more efficient. Therefore the high energy demand of their milk production tends to result in loss of body tissues and low condition score.

## In-class activity

### Discussion

Consider allowing 40 to 60 minutes for this class discussion.

The class will be divided into groups and each will be allocated an animal species. There should be a mixture of farm and companion animal species selected in this exercise.

Each group must identify for their allocated species:

- the main production-related disease(s) (farm) or breed-specific disease(s) (companion animals)
- the causes of the disease according to breeding or infection
- how husbandry and environmental factors may exacerbate or ameliorate the intensity of the disease-related welfare issues

Groups will then be paired up to discuss and compare the above in relation to two animal species.

Individuals within each group pairing will then vote on which animal species in a specific system they believe has the biggest welfare compromise.

At the end of the discussion, votes will be counted by the lecturer and the results reported back to the class for further discussion, if time permits.

## Applied Learning Opportunities

### Welfare assessment exercise (Repeated in Module 11)

Prepare a welfare assessment protocol and use it to conduct a welfare assessment for a group of animals within an animal production system that you can visit or are completing work experience with.

Students can complete this exercise individually or in groups.

Students will need to consider what they have learnt about the principles of animal welfare science and use this exercise as an opportunity to apply these principles and gain experience in-situ in assessing the welfare of animal species in the context of farming. Students will need to gain access to animals in order to complete this animal welfare assessment exercise.

#### *The context*

Students can choose to conduct their animal welfare assessment exercise by focusing on one of the following:

- One animal species in one situation or context
- One animal species in the same context in two different locations
- One animal species in two different systems
- Two animal species in one system

#### *Notes to lecturer:*

The use of animal-based measures (outcome measures) is thought to afford the clearest information about the actual welfare state of an animal in terms of their behaviour, health and physiology. However, it is also important to consider the aspect of the animal's environment (welfare inputs) that may also affect animal welfare, in terms of housing design and resources for example. Therefore students will need to evaluate the welfare of animals in each situation based on the animals' physical condition and behaviour in association with factors such as housing, nutrition, veterinary care, human-animal interactions.

The data sheet below contains an example of specific measures for use with dairy cattle. Depending on which species and context the students are assessing, they will need to adapt or develop the measures they are going to use.

Welfare assessment protocols, including that for Qualitative Behaviour Assessment(QBA), have already been developed for dairy cattle, beef cattle, veal calves, sows, fattening pigs, laying hens and broilers by the Welfare Quality® project (see the Welfare Quality® website for further details: [www.welfarequality.net/everyone/43148/9/0/22](http://www.welfarequality.net/everyone/43148/9/0/22))

Welfare assessment protocols are currently in development for sheep, goats, turkeys, horses and donkeys as part of the Animal Welfare Indicators (AWIN) project (see the AWIN website for further details: [www.animal-welfare-indicators.net/site/index.php/work-package-1](http://www.animal-welfare-indicators.net/site/index.php/work-package-1)).

<b>Welfare Principle</b>	<b>Welfare Criteria</b>	<b>Example Measures for dairy cows</b>
Good feeding	Absence of prolonged hunger	<i>Body condition score</i>
	Absence of prolonged thirst	<i>Water supply</i>
Good housing	Cleanliness	<i>Cleanliness</i>
	Behaviours around resting	<i>Time needed to lie down % of animals colliding with housing equipment during lying down</i>
	Ease of movement	<i>Presence of tethering Access to outdoor loafing area and/or pasture</i>
Good health	Absence of injuries	<i>Lameness score</i>
	Absence of disease	<i>Respiratory disorders Enteric disorders Reproductive disorders Other parameters</i>
	Absence of pain induced by management procedures	<i>Routine mutilations</i>
Appropriate behaviour	Expression of social behaviour	<i>Indices of agonistic behaviours</i>
	Expression of other behaviours	<i>Qualitative behaviour assessment</i>
	Good human-animal relationship	<i>Avoidance distance at the feeding place</i>
	Positive emotional state	<i>Avoidance distance in the home pen</i>

(from the **Welfare Quality® Assessment Protocol for cattle**, available free online as a pdf from the **Welfare Quality® website**: [www.welfarequality.net/everyone/43148/9/0/22](http://www.welfarequality.net/everyone/43148/9/0/22))

Encourage students to consider their findings and how they relate to any welfare criteria included in existing food quality assurance schemes standards or associated legislation.

During class time at a later stage of the term when the welfare assessments have been completed, try to encourage students to discuss, compare and contrast their findings (and what worked and didn't work) with other students/students groups, particularly if students have conducted welfare assessments on one animal species in a specific situation/context.

## Visit a farm

Students should visit an animal production system or farm or obtain work experience at one. They should be required to complete a report using the following guidelines which should be shared with them in advance so that they can gather the appropriate information while visiting/on placement. This report focuses on qualitative data as opposed to the quantitative data gathered using the assessment protocol outlined above. Both of these activities can be combined.

### 1. Background information

A brief introduction to the establishment. Identify the animal species involved and how many animals are present. The history and some data about the scale of the particular industry should be included along with the objectives of the individual establishment.

### 2. The daily routine of the animal establishment

Outline the system of production and management employed in the animal establishment including information about daily and other cyclical routines and how resources are distributed (diagrammatic representation of this may be useful). Identify the inputs and outputs of the system.

### 3. The species typical environment and behaviour

Provide an overview of the natural environment and behaviour of the animal species concerned. Reference scientific literature where possible.

### 4. Evaluation of the current environment

Provide an overview of the extent to which the establishment and its management system replicate the natural environment of the animal species concerned. Use the framework of the Five Freedoms and explain how the animal's behaviour and welfare is positively or negatively affected by the system in which they are living. Reference scientific literature where possible.

### 5. Evaluation of ethical issues

Identify and comment on the potential ethical issues associated with the way the animals are used and managed in the establishment. Use the framework of an Ethical Matrix to explore and explain the implications for different stakeholders according to various ethical principles.

### 6. Summary/conclusion

Bring together all the strands discussed in the report to summarise the experience, the establishment and the experience for the animals concerned.