



Higher National Unit specification

General information for centres

Unit title: Livestock Health: Approaches to Disease Control

Unit code: F2E9 35

Unit purpose: This Unit will equip candidates with the Knowledge and Skills in approaches to the control of parasites and infectious diseases in farm livestock. This is achieved by examining the principles of drug and vaccine development and their use in farm livestock. The importance of early veterinary diagnosis and disease surveillance in the control of infectious disease are also examined.

On completion of the Unit the candidate should be able to:

- 1 Evaluate the development and use of drugs for use with farm livestock.
- 2 Evaluate the role of drugs in the maintenance of health in livestock.
- 3 Explain the production and use of vaccines in maintaining livestock health.
- 4 Explain the approaches to veterinary diagnosis and surveillance and the control of animal disease.

Credit points and level: 1 HN credit at SCQF level 8: (8 SCQF credit points at SCQF level 8*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However it is recommended that candidates have studied biological subjects at SCQF level 7 as evidenced by completion of the Higher National Units F2E8 34 *Livestock Growth*, F21L 34 *Health and Welfare, Microorganisms and their Growth and Activity*, and F21K 34 *Livestock Physiology* or any equivalent level of study.

Core Skills: There are opportunities to develop the component Critical Thinking of the Core Skill of *Problem Solving* and the components Oral Communication or Written Communication of the Core Skill of *Communication*, all at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

General information for centres (cont)

Assessment: In assessing theory, an integrated approach can be utilised for Outcomes 1, 3 and 4 using a holistic end-of-Unit assessment with evidence being provided on a sample basis as detailed in the Evidence Requirements.

The aim and subject topic/s for the assessment for Outcome 2 could be introduced early on in the delivery of the Unit allowing ample time for candidates to plan, gather and review information and organise and evaluate material for their submission.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Evaluate the development and use of drugs for use with farm livestock

Knowledge and/or Skills

- ◆ Extraction, synthesis and screening of potential drugs
- ◆ Legislation
- ◆ Drug testing and basic drug terminology
- ◆ Choice of method for drug administration

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and understanding of the development of drugs and their use in farm livestock.

Evidence for this Outcome is generated via sampling. Two of the four Knowledge and Skills items will be sampled per assessment occasion. A different sample should be chosen on each assessment occasion.

- ◆ explain the main approaches to the extraction, synthesis and screening of chemicals with potential drug action for use on farm livestock
- ◆ explain the relevant basic UK legislation, with specific reference to the main act covering the use of drugs in farm livestock
- ◆ explain the main procedures and important terminology used in drug testing
- ◆ evaluate the principle factors that govern the choice of method for the administration of drugs

This assessment will be unseen and conducted in closed-book, supervised conditions.

Assessment Guidelines

Assessment of this Outcome provides the opportunity to combine assessment for Outcomes 1, 3 and 4 by using a single holistic assessment consisting of a mixture of restricted and extended response questions. The assessment could last for approximately 90 minutes. This assessment will be unseen and conducted in closed-book, supervised conditions.

Higher National Unit specification: statement of standards (cont)

Unit title: Livestock Health: Approaches to Disease Control

Outcome 2

Evaluate the role of drugs in the maintenance of health in livestock

Knowledge and/or Skills

- ◆ Parasites and parasitic conditions of livestock
- ◆ Pathogenic effects of infestation and of infectious disease
- ◆ Safe chemical control of parasites
- ◆ Antibiotics in livestock

Evidence Requirements

The candidate will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they are able to:

- ◆ explain the life cycle and mode of transmission of five parasites which cause parasitic conditions in livestock
- ◆ explain the pathogenic effects of infestations and of infectious diseases in livestock to include the clinical signs and mode of transmission for five diseases
- ◆ evaluate seven methods for the safe chemical control of parasitic conditions in livestock to include the use of dips, sprays and pour-ons
- ◆ explain two examples of the use of antibiotics in the treatment of infectious disease in livestock

Assessment Guidelines

Assessment of this Outcome is suited to the production of evidence in the form of a scientific report requiring extended response answers or problem solving tasks to set questions, to include referencing and bibliography. The candidate should be given sufficient time to gather and present the necessary evidence.

Higher National Unit specification: statement of standards (cont)

Unit title: Livestock Health: Approaches to Disease Control

Outcome 3

Explain the production and use of vaccines in maintaining livestock health

Knowledge and/or Skills

- ◆ Active and passive immunity
- ◆ Live and killed vaccine production
- ◆ Vaccine control of livestock disease
- ◆ Recombinant technology: vaccine design
- ◆ Genetically engineered vaccines

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and understanding of the principles, production and use of vaccines in maintaining livestock health.

Evidence for this Outcome will be generated via sampling. Three of the five Knowledge and Skills items will be sampled per assessment occasion.

- ◆ explain active and passive immunity, giving for each, both a naturally occurring example in livestock and an example where they are achieved through human intervention
- ◆ explain four novel approaches to the production of vaccines (two approaches to the production of live vaccines and two approaches to the production of killed vaccines)
- ◆ describe how vaccines are routinely used to prevent or control infectious disease in farm livestock, with reference to two examples
- ◆ explain four novel approaches to the design of vaccines which utilise the techniques of recombinant technology
- ◆ identify two examples where vaccines produced by recombinant techniques, are used in the control of animal disease

This assessment will be unseen and conducted in closed-book, supervised conditions.

Assessment Guidelines

Assessment of this Outcome provides the opportunity to combine assessment for Outcomes 1, 3 and 4 by using a single holistic assessment consisting of extended and restricted response questioning. The assessment could last for approximately 90 minutes.

Higher National Unit specification: statement of standards (cont)

Unit title: Livestock Health: Approaches to Disease Control

Outcome 4

Explain the approaches to veterinary diagnosis and surveillance and the control of animal disease

Knowledge and/or Skills

- ◆ Epidemiology
- ◆ Prophylactic and therapeutic control measures
- ◆ Clinical signs in disease diagnosis
- ◆ Serological, microbiological and biochemical testing
- ◆ Pathological methods

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and understanding of the diagnosis, surveillance and control of animal disease.

Evidence for this Outcome will be generated via sampling. Three of the five Knowledge and Skills items will be sampled per assessment occasion.

- ◆ explain epidemiology and its importance in the control of animal disease
- ◆ explain the distinction between prophylactic and therapeutic measures in health control programmes in farm livestock
- ◆ explain the importance of the gathering and interpretation of clinical signs in the accurate diagnosis of disease
- ◆ explain biochemical, microbiological and serological laboratory testing
- ◆ explain the use of gross pathology and histopathology in disease diagnosis

This assessment will be unseen and conducted in closed-book, supervised conditions.

Assessment Guidelines

Assessment of this Outcome provides the opportunity to combine assessment for Outcomes 1, 3 and 4 by using a single holistic assessment consisting of extended and restricted response questioning. The assessment could last for approximately 90 minutes.

Administrative Information

Unit code: F2E9 35

Unit title: Livestock Health: Approaches to Disease Control

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Higher National Unit specification: support notes

Unit title: Livestock Health: Approaches to Disease Control

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is intended for candidates who are studying for a Group Award such as Agricultural Science, Animal Science or Applied Bioscience. Many of these candidates will take up a post from a wide variety of employment opportunities in applied biological science or the livestock science industry and it will equip them with knowledge and understanding of approaches used in the control of parasites and infectious disease in livestock production. It is intended that the Outcomes will be taught in the general context of important agricultural livestock species. The content builds on the knowledge and understanding delivered in several SCQF level 7 Units such as F21L 34 *Microorganisms and their Growth and Activity*, F21K 34 *Livestock Physiology* and F2E8 34 *Livestock Growth Health and Welfare*. This Unit will enable the candidate to extend their knowledge about the approaches used to control infectious diseases in animals and in farm livestock in particular.

Outcome 1 explains the development, testing and use of drugs for therapeutic use with farm livestock. It introduces relevant legislation, important terminology and allows an evaluation of methods used for the administration of drugs in livestock.

Outcome 2 focuses on parasites, infestations and infectious diseases in livestock and approaches to control using drugs. Parasites currently important in farm livestock should be chosen and their life cycles and thus, mode of transmission explained. Similarly infestations and infectious diseases of current importance in farm livestock should be chosen and their pathogenic effects explained, as well as examples of current use of antibiotics in the treatment of infectious disease in livestock. This Outcome allows an evaluation of current methods for the safe chemical control of parasitic conditions in farm livestock.

Outcome 3 focuses on the development and use of vaccines as a prophylactic approach to the control of infectious disease. It is intended to deal more with general principles of vaccine design and usage, rather than with lists of specific examples of vaccines and their use in specific livestock. Covered in this Outcome will be: active and passive immunity with both natural examples and examples as a result of human intervention; live vaccines, related strain and attenuated; inactivated strain vaccines including whole organism and toxoids or purified cellular components; modern vaccine development using recombinant technology: approaches including logical attenuation, including the deletion of genes for virulence and 'housekeeping mutations', carrier vaccines and subunit vaccines. Vaccines in use would be exemplified by case studies.

Higher National Unit specification: support notes (cont)

Unit title: Livestock Health: Approaches to Disease Control

Outcome 4 is an examination of the practical measures taken in the veterinary control of animal disease. It focuses on the principles of disease control using interpretation of clinical signs for correct diagnosis, recording of this information and using it for epidemiological purposes to survey and predict disease outbreak. It examines the use of drugs for both prophylactic and therapeutic use and investigates how they might be used successfully as part of a health plan or health control programme. Teaching in this Outcome can allow the development of laboratory skills if some practical sessions are included. These could involve the use of microbiological techniques for accurate diagnosis. Additionally, it would be helpful if candidates could have the opportunity to take part in some basic serological techniques (FAT and Elisa) and take part in techniques for the basic diagnosis of some parasitic conditions.

Guidance on the delivery and assessment of this Unit

This Unit is designed to form part of Group Awards such as ‘Applied Bioscience’, ‘Agricultural Science’ and ‘Applied Animal Science’ which are intended to prepare candidates for employment in a wide variety of opportunities in an applied biological science or agricultural science related industry. The Unit would benefit greatly from background knowledge and understanding of associated Units of study at SCQF level 7 and could be delivered, for example, in the second year of the above HND programmes.

It is advisable to encourage independent study, particularly during Outcome 2, where the production by the candidate of an individual report as the instrument of assessment, involves the use of a variety of resources.

Assessment of Outcomes 1, 3 and 4 is by production of appropriate evidence which should be generated by a sampled, holistic assessment approach.

Opportunities for developing Core Skills

There are opportunities to develop the component Critical Thinking of the Core Skill of *Problem Solving* and the components Oral Communication or Written Communication of the Core Skill of *Communication*.

Problem Solving may be developed where candidates are asked to produce a report as part of their assessment. This would require candidates to use a substantial degree of critical thinking, to plan and organise their workload, review and evaluate gathered evidence and finalise their report.

Candidates are also required to produce and structure complex where asked to evidence their knowledge in the assessments for Outcomes 1, 3 and 4.

Open learning

This Unit could be delivered by distance learning. However it would require planning by the centre to ensure the sufficiency and authenticity of candidate evidence.

Higher National Unit specification: support notes (cont)

Unit title: Livestock Health: Approaches to Disease Control

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).

General information for candidates

Unit title: Livestock Health: Approaches to Disease Control

This SCQF level 8 Unit is designed to build on your knowledge about microorganisms and animal disease. This Unit will enable you to extend your knowledge about the approaches used to control parasites and infectious diseases in animals and in farm livestock in particular.

On completion of this Unit you should be able to:

- 1 Evaluate the development and use of drugs for use with farm livestock.
- 2 Evaluate the role of drugs in the maintenance of health in livestock.
- 3 Explain the production and use of vaccines in maintaining livestock health.
- 4 Explain the approaches to veterinary diagnosis and surveillance and the control of animal disease.

Outcome 1 introduces you to approaches to the synthesis, extraction and screening of chemicals with potential drug action and how these potential drugs are tested for safety and efficacy. You should be able to explain how drugs are administered to animals and to evaluate the factors affecting the choice of method used in a variety of cases. You will also cover the basic legislation covering the use of drugs in farm livestock.

Outcome 2 looks at examples of parasitic conditions of livestock, including life cycles and their mode of transmission. Additionally you will have to evaluate modern, safe chemical methods used to control such parasites and to study the pathology of some infestations and infectious diseases. You will then examine the approaches to disease control including the use of antibiotics.

In **Outcome 3** you will learn about the difference between active and passive immunity, which will remind you about the functioning of the mammalian immune system. You will study the principles underlying the production of live and killed vaccines and their use in the prophylactic control of infectious disease. Finally, you will learn about novel approaches to the design of vaccines using the techniques of recombinant DNA manipulation and how such vaccines have the potential to extend prophylactic control of disease.

Outcome 4 concentrates on drawing the distinction between therapeutic and prophylactic measures. You will study the principles and use of epidemiology in the control of animal disease and also the approaches to veterinary diagnosis. This will include the importance of gathering and interpreting clinical signs; laboratory testing including biochemical, microbiological and serological methods and the use of both gross pathology and histopathology.

For the assessment of Outcome 2 you may be required to prepare a report which would ideally be assigned to you early in the delivery of the Unit, allowing you ample time to plan, find and review information and organise and evaluate material. An integrated approach may be utilised for the assessment of Outcomes 1, 3 and 4, using a single end-of-Unit assessment containing a mixture of extended and restricted response questioning. The assessment will involve a sampling of the Knowledge and Skills that you learn during the Unit.

During the course of this Unit, there may be opportunities for you to develop and enhance your Core Skills, in the areas of *Communication*, and *Problem Solving*, which are transferable skills you can be apply to other areas of study or employment.