



National Unit specification: general information

Unit title: Maintaining Health in Laboratory Animals (SCQF level 6)

Unit code: F9XJ 12

Superclass: SN

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Summary

This Unit has been designed to give candidates an introduction to maintaining health in laboratory animals. The Outcomes require candidates to describe the signs of health and disease in common laboratory animals and the requirements of an adequate diet at different life stages. Candidates are also required to identify potential causes and sources of different types of disease and to describe methods to prevent or control infectious diseases. It is expected that candidates will have current experience of working in an animal laboratory facility.

Outcomes

- 1 Identify signs of health and disease in laboratory animals.
- 2 Explain the role of nutrition in maintaining the health of laboratory animals.
- 3 Describe causes of non-infectious disease in laboratory animals.
- 4 Identify sources and methods of transmission of infectious disease in laboratory animals.
- 5 Describe methods to monitor animal health and prevent infectious disease in laboratory animal units.

Recommended entry

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ Standard Grade Biology at grade 1 or 2
- ◆ Standard Grade Science at grade 1 or 2

General information (cont)

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Credit points and level

1 National Unit credit at SCQF level 6: (6 SCQF credit points at SCQF level 6*)

**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.*

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill component in this Unit.

National Unit specification: statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Identify signs of health and disease in laboratory animals

Performance Criteria

- (a) Clinical signs of health and common clinical signs of disease are correctly described
- (b) An animal's health is correctly evaluated by clinical examination

Outcome 2

Explain the role of nutrition in maintaining the health of laboratory animals

Performance Criteria

- (a) The constituents of a complete diet are correctly described in relation to animal health
- (b) Explain and interpret information from food manufacturers in relation to packaging, storage and need for supplements
- (c) Requirements for major nutrients are correctly described in relation to life stage

Outcome 3

Describe causes of non-infectious disease in laboratory animals

Performance Criteria

- (a) Describe in simple terms the main non-infectious causes of disease in laboratory animals
- (b) Describe in simple terms the role that stress can play in susceptibility to disease
- (c) Describe the breadth of clinical phenotypes which can result from genetic manipulation, emphasising the range of clinical severity

Outcome 4

Identify sources and methods of transmission of infectious disease in laboratory animals

Performance Criteria

- (a) Describe correctly how viruses, bacteria and parasites gain entry to a laboratory animal's body and cause disease
- (b) Describe correctly how infectious disease is transmitted between animals

National Unit specification: statement of standards (cont)

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Outcome 5

Describe methods to monitor animal health and prevent infectious disease in laboratory animal units

Performance Criteria

- (a) Describe correctly the barriers to the entry and spread of infectious disease in laboratory animal units
- (b) Describe correctly the elements of health monitoring regimes in laboratory animals
- (c) Describe correctly the methods used to disinfect and sterilise materials in a laboratory animal Unit

Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria. This will include practical evidence as described in Outcome 1. Otherwise written or oral evidence is required which shall be in the form of reports, as described in Outcomes 1 and 5 or shall be obtained under controlled, supervised conditions, as a closed-book assessment that should be completed within one hour. One closed-book assessment each for Outcomes 1, 2, 3 and 4.

Outcome 1

- ◆ The candidate must correctly describe the following common clinical signs of health and disease:
 - Movement
 - Absence of discharges
 - Mental awareness
 - Normal body functions
 - Normal behaviour
- ◆ Performance evidence, supplemented by a written assessor record, is required which demonstrates that the candidate has conducted clinical examinations of laboratory animals (typically rodents) to the standard described in Outcome 1 and the associated Performance Criteria. Both healthy and unhealthy animals should be examined and the observations made by the candidate provided in writing or orally. An assessor record/checklist of the conduct of the examinations should record the candidate's achievement and be retained by the centre.

National Unit specification: statement of standards (cont)

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Outcome 2

- ◆ The candidate must correctly describe and provide a simple explanation of the purpose of the following constituents of a complete diet:
 - Protein
 - Carbohydrate
 - Fats
 - Vitamins
 - Minerals
 - Water
 - Trace elements.

The description must include the definition of a 'complete' diet.

- ◆ Candidates must correctly interpret information from food manufacturers in relation to the following:
 - Packaging
 - i types of packaging
 - ii batch number
 - iii use-by dates
 - Storage
 - i temperature
 - ii humidity
 - iii rotation
 - iv protection
 - Need for supplements
 - i fresh produce
 - ii roughage
 - iii vitamins
 - iv minerals

Candidates must explain which information would be needed if a problem with a batch of diet was going to be reported to the manufacturer.

- ◆ The candidate must correctly describe the requirements for major nutrients in relation to life stage by comparing the needs of juvenile, growing animals to adult animals.

Outcome 3

- ◆ The candidate must correctly describe a minimum of five non-infectious causes of disease in laboratory animals from the following:
 - neoplasia
 - degeneration
 - toxicity
 - injury
 - congenital malformations
 - metabolic abnormalities
 - genetic abnormalities
 - inadequate environments.
- ◆ The candidate must correctly describe the role that stress can play in increasing susceptibility to disease.
- ◆ The candidate should be able to describe the breadth of clinical phenotypes which can result from genetic manipulation, emphasising the range of clinical severity that can

ensue.

National Unit specification: statement of standards (cont)

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Outcome 4

- ◆ The candidate must correctly describe how viruses, bacteria and parasites gain entry to a laboratory animal's body and cause disease by damaging tissues, interrupting the normal function of organs and causing neoplasia.
- ◆ The candidate must correctly describe how infectious disease is transmitted between animals by the common and important routes of infection in laboratory animals, eg. faecal/oral transmission, close physical association, sexual transmission and via aerosols to the respiratory tract. The candidate should be able to describe the role of fomites in transmitting infectious organisms.

Outcome 5

For Outcome 5 the candidate must provide written and/or oral evidence approximately the equivalent of 800 to 1,000 words. This evidence must include:

- ◆ The candidate must correctly describe the barriers to entry and spread of infectious disease in laboratory animal units for both general and a specific case
- ◆ The candidate must correctly describe the elements of health monitoring regimes in laboratory animals for both general and a specific case.
- ◆ The candidate must correctly describe the methods used for disinfection of a procedure room with the following disinfectants:
 - Phenols
 - Alcohols
 - Quaternary ammonium compounds
 - Iodophors
 - Amphoteric
- ◆ The candidate must correctly describe three of the following methods used to sterilise materials in a specific laboratory animal Unit:
 - Wet and dry heat
 - Irradiation
 - Filtration
 - Fumigation

National Unit specification: support notes

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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

On completion of the Unit the candidate will have been introduced to the concepts of health and disease including the role of nutrition in maintaining health. They will be introduced to the causes and sources of disease, methods of transmission of infectious disease and important means by which infectious disease is prevented and controlled in laboratory animals. Throughout the Unit emphasis will be placed on the requirements for maintaining health.

Candidates working in laboratories are often only trained in one type of facility with one species of animal. The concepts explored in this Unit should be in a generalised format to enable the candidate to gain basic information which can be adapted to other species or animal facilities in which they may work in the future, however there will be an emphasis on the common mammalian species used as laboratory animals. A knowledge of normal and abnormal behaviour, common signs of health and disease and routine disease prevention measures is required. The health and safety aspects of working with laboratory animals should be taken into account throughout the Unit as should the welfare and well-being of laboratory animals.

Outcome 1

The candidate should have a good working knowledge of the normal behaviours, activities and appearance associated with health in laboratory animals and the changes which occur during different life stages and also due to common diseases. Behaviours and activities should include eating, drinking, sleeping, interaction with other animals and their environment, response to stimuli, urination, defaecation, grooming, locomotion, exploring and other species-specific behaviours. Visual examination of an animal should encompass the entire external surface of the animal and take note of the appearance of all external features including orifices, the presence of lesions, the state of the hair coat and the posture of the animal. The importance of accuracy of records of examinations should be understood.

Outcome 2

Nutritional management should include knowledge of the required dietary components for the animal species and life-stage. Whilst the components of the correct diet should be explained, the metabolism of nutrients should be covered elsewhere. The need for a strictly controlled diet in laboratory animals to minimise variation in scientific studies should be emphasised. The candidate should appreciate the effects of nutrition on maintaining health and understand some specific examples of nutritional diseases. Typical information provided by laboratory animal diet manufacturers should be used to ensure that the candidate can interpret this information correctly

National Unit specification: support notes (cont)

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Outcome 3

The candidate will be made aware of the wide range of possible causes of disease other than infectious organisms and nutritional disease. This should include a simple description of the specific causes of disease listed in the Evidence Requirements for this Unit. The candidate should also understand the wide range of clinical phenotypes that can occur in genetically altered animals from clinically normal to developing human genetic diseases to being immunocompromised to being labelled with foreign proteins that allow visualisation of specific tissues.

Outcome 4

By explaining how infectious organisms gain entry to animals' bodies and cause disease and how they are transmitted between animals the candidate will be made aware of how infectious organisms can enter a laboratory Unit and cause disease. This should then lead naturally to understanding methods of prevention of infectious disease. Examples should be used from laboratory animals, for example MHV in mice, *Pastuerella pneumotropica* in rabbits, nematode and cestode parasites (eg *Syphacia* in rats) and mites (eg *Myocoptes* in mice).

Outcome 5

Prevention of infectious disease should emphasise the methods used to prevent the entry of infectious organisms to a laboratory animal population, that is the cage level and Unit level barriers that are commonly used. This should include reference to the barriers in place at a Unit with which the candidate is familiar including the nature of the physical barrier, control of animals and materials that enter the Unit, control of personnel movement into the Unit and methods used to reduce transmission of disease within the Unit (ieie. hygiene measures and cage/room level barriers). The control of animal entry into units should encompass the principles of isolation, testing and rederivation. The use of disinfectants and sterilisation to prevent and control disease should also be included. The principle of using vaccines to control disease should be understood, however specific examples and detailed information is not necessary.

Health monitoring should include how the health of the animals is monitored in a laboratory animal Unit, eg by clinical examination, post mortem examination and testing of samples. Routine testing should be understood in terms of which animals can be used (eg sentinels), the availability of commercial testing and what information is commonly obtained.

Guidance on learning and teaching approaches for this Unit

The learning should occur through interaction with the teaching materials, completing the assessments and to a large extent also in the candidate's workplace where they are likely to be checking animals for their state of health on a routine basis and putting into practice the principles of disease recognition, prevention and control that are covered in this Unit. Therefore candidates will need to be working in a laboratory animal Unit to satisfactorily complete this Unit. Candidates will also be able to refer to industry specific animal health textbooks and internet sites. For the latter, relevant information can be found on sites maintained by commercial animal breeders, animal testing laboratories, diet manufacturers, laboratory animal science organisations, animal research funders and organisations committed to improving the welfare of laboratory animals.

National Unit specification: support notes (cont)

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Opportunities for developing Core Skills

There is no automatic certification of Core Skills or Core Skills components for this Unit.

However, there may be opportunities to develop the Core Skill *Problem Solving* component Critical Thinking.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

History of changes to Unit

Version	Description of change	Date

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