Higher National Unit specification: general information

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

Unit code: H0YK 35

Superclass: SN

Publication date: March 2012

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is designed to develop knowledge and understanding of the principles of diagnostic radiography and a working knowledge of radiographic equipment and procedures. It is designed for candidates who are undertaking a course of study in veterinary nursing and who are aiming to progress to employment in a veterinary practice or similar working environment.

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

1 Describe the health and safety legislation relating to radiographic procedures.
2 Explain the principles of radiography.
3 Explain the techniques required to produce a diagnostic image.
4 Explain the principles and application of ultrasound, endoscopy and other imaging techniques to veterinary diagnoses.

Recommended prior knowledge and skills

Candidates should have achieved passes in relevant level 7 Units in the HNC/D Veterinary Nursing framework, or equivalent. Prior achievement in the Units *Veterinary Nursing: Canine and Feline Anatomy and Physiology*, *Veterinary Nursing: Essential Nursing Skills* and *Veterinary Nursing: Supervised Practice 1* would be particularly beneficial. Candidates should, ideally, have achieved a credit level pass in Standard Grade Physics, or equivalent. Completion of the Unit *Veterinary Nursing: Supervised Practice 2* in the practice placement will complement the delivery of this Unit.

General information (cont)

Credit points and level

1 Higher National Unit 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.*

Core Skills

There are opportunities to develop the Core Skills of *Information and Communication Technology (ICT)* at level 5 and the Written Communication and Using Number components of *Communication* and *Numeracy* at level 5 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. It is included in the framework of the HND in Veterinary Nursing.

Higher National Unit specification: statement of standards

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

Unit code: H0YK 35

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

Describe the health and safety legislation relating to radiographic procedures.

Knowledge and/or Skills

- Relevant general health and safety legislation:
  - — Health and Safety at Work Act (1974)
  - — Collection and Disposal of Waste Regulations (1988)
  - — Control of Substances Hazardous to Health (COSHH) Regulations (2002)
- Specific health and safety legislation:
  - — Ionising Radiation Regulations (1999)
  - — Code of Practice (1985)
  - — Guidance notes for the protection of persons against ionising radiations arising from veterinary use (1988)
  - — Local radiation rules and regulations
- Any newly introduced legislation.

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- describe two relevant points from one piece of general health and safety legislation
- describe the relevant parts of the Ionising Radiation Regulations (1999)
- describe the relevant parts of the guidance notes for the protection of persons against ionising radiations arising from veterinary use (1988)

Higher National Unit specification: statement of standards (cont)

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

Outcome 2

Explain the principles of radiography.

Knowledge and/or Skills

- Dangers of radiation and techniques used to minimise danger.
- Principles of radiography.
- Principles of digital imaging.
- Apparatus used to record an x-ray image.
- Factors affecting the quality of an x-ray image.
- Image production — manual, automatic and computer.
- Design features of a radiographic facility.

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- describe two techniques used in veterinary radiography to minimise danger from radiation
- explain x-ray production
- describe three components of a veterinary x-ray machine
- explain the advantages and limitations of digital imaging
- describe six factors which can reduce the quality of an x-ray image
- explain image production in automatic processing.

Higher National Unit specification: statement of standards (cont)

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

Outcome 3

Explain the techniques required to produce a diagnostic image.

Knowledge and/or Skills

- Relevant health and safety.
- Selecting appropriate equipment.
- Determining exposure factors.
- Positioning animals for a diagnostic radiograph.
- Evaluation of the diagnostic quality of processed radiographs.
- The use of contrast media.
- Techniques used to achieve contrast radiography.
- Clinical considerations given to debilitated patients.

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- describe the preparation of equipment for one diagnostic imaging scenario
- calculate exposure factors for the given scenario using common radiographic formulae
- describe the positioning of a patient in one diagnostic imaging scenario
- explain the necessary health and safety precautions in the given diagnostic imaging scenario
- evaluate the diagnostic quality of a processed film
- explain the use and techniques associated with two forms of contrast media
- explain the additional considerations required when performing radiography on debilitated patients

Higher National Unit specification: statement of standards (cont)

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

Outcome 4

Explain the principles and application of ultrasound, endoscopy and other imaging techniques to veterinary diagnoses.

Knowledge and/or Skills

- Ultrasound
- Endoscopy
- Magnetic resonance imaging
- Computer aided tomography
- Nuclear imaging (scintigraphy)

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- explain the principles of ultrasound, endoscopy and one other diagnostic imaging technique
- explain the application of ultrasound, endoscopy and one other diagnostic imaging technique to veterinary diagnoses.

All explanations should cover:

- principles
- technical details
- specialist equipment required
- clinical applications
- relevant Health and Safety details

Higher National Unit specification: support notes

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

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

Although this Unit may be taken by any candidate wishing to develop and/or enhance their knowledge and skills, it is primarily intended for candidates of the HND in Veterinary Nursing and the teaching and learning should be delivered in this context.

Additional information relating to each Outcome is given below.

Outcome 1

General health and safety legislation will be covered in other Units but its particular importance with respect to radiography should be emphasised. Health and safety legislation specific to radiography should be considered in detail. Care should be taken to ensure that any recently introduced legislation relevant to veterinary radiography is covered. Students are made aware of when and why radiographs are used in veterinary medicine: this will apply also to alternative imaging where appropriate. Methods of monitoring and limiting exposure risks, to include considerations in pregnancy, young persons and untrained personnel. Appointments and protocols required to maintain safe working practices such as recording exposure factors and image quality. Awareness of roles within the practice such as the Radiation Protection Advisor and Radiation Protection Supervisor. Implications to personnel and patients, of inaccurate or incorrect exposures to include adverse effects of radiation such as somatic, carcinogenic and genetic effects. Measurements for exposure risk assessment and monitoring, this will include Ionising Radiations Regulations maximum exposure limits, effective use of dosemeters, reducing exposure risk and protective clothing. Maintaining equipment and care of protective clothing, to include annual maintenance checks and taking appropriate action to rectify any faults. Identification of risk factors and the importance of risk assessments to practices.

Higher National Unit specification: support notes (cont)

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

Outcome 2

Techniques used to minimise radiation dangers should include reference to light beam diaphragms, grids and exposure factors. The principles of radiography should include x-ray production and the physics behind it, to include the role of the anode and cathode, including thermionic emission. X-ray machines and the function of the equipment to include exposure factors also. The properties and effects of radiation, to include: primary beam and scatter, absorption by different materials/tissues to include animate and inanimate subjects with a range of densities. Film types, screens, cassettes, labels and grids should all be covered to include the care and maintenance of such items. This area will also include methods of storage, grid factor and ratio. The effects of exposure factors and processing techniques on the quality of x-ray images should be emphasised, to include the effects of varying kilovoltages (kV) and miliamperage (mA) and their relationship. The principles of processing should include manual and automatic with reference to darkrooms and the chemicals used in processing to include the disposal of waste. The design features of a radiographic facility to include wet and dry areas re manual processing and to include ideal digital processing set up to include also the structure and function and maintenance of automatic processing. Completion of this Outcome should give equal emphasis to the use of traditional film and digital imaging techniques. Coverage should include the principles of digital imaging, together with advantages and limitations. Mention should also be made of computer processing and the resultant image.

Higher National Unit specification: support notes (cont)

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

Outcome 3

This Outcome should consist of both classroom and practical sessions covering the theory and practical aspects of veterinary radiography. This should form a comprehensive underpinning of the associated practical work carried out in the veterinary work placement. Positioning techniques should include reference to clinical considerations, especially for the debilitated patient, animal welfare should be a consideration at all times, including monitoring during radiographic procedures. Environmental adjustments to be considered for different types of patients. Animal must be encouraged to feel at ease during any of the procedures listed in Outcome 3 and 4. Students should confirm with a veterinary surgeon area to be radiographed or the use of alternative imaging, the importance of communication with the veterinary surgeon, should be highlighted. Students should be familiar with alternative imaging techniques and be able to explain why these methods are the modes of choice. Methods of patient restraint to be included, incorporating chemical and manual restraint including health and safety implications and the Approved Code of Practice Rules set out by BVA in 2002, regarding manual restraint of the patient. Radiographic positioning should include positioning aids, views and nomenclature. Significance of differing views for diagnostic purposes. Identification of films and identification of collimation borders and centring points for a range of views should be considered. Placement of a grid or cassette should be highlighted at this point. Views should include limbs, head, spine, abdomen, thorax pelvis and should include different types of animal for different types of diagnostic imaging. A video recording of students performing radiographic positioning tasks is a useful tool to allow students to evaluate their own practice and others whilst developing their own skills. Identification of the area to be radiographed/alternative imaging mode correctly and undertake the appropriate pre diagnostic imaging preparation. The identification of equipment and its uses would include grids, cassettes and intensifying screens. Calculating exposure factors correctly to include general formulas used in practice when calculating Focal Film Distance, new mAs, taking radiographs when animal has been bandaged with Plaster of Paris or similar materials and also applying Santes formula when necessary. Evaluation of films and the film faults could be performed during practical and theoretical sessions to include terms associated with radiographic quality — density, contrast, sharpness, causes of under/over exposure. Identification of common faults such as contamination of screens, double exposure, static electricity, chemical splashes, crimp marks, white light exposure, effects of under/over exposure and identification of movement including the penumbra effect, to include damage to materials involving damage to packaging, deterioration and contamination, should be identified and recorded appropriately with the details of patient and techniques applied to include exposure factors, etc. The quality of digital images should also be explored.

Contrast radiography should include the use of positive, negative and double contrast media, their uses and implications of contrast media for Alimentary tract studies, Myelography, Arthrography and Urinary tract studies. Patient care and safety should be considered during contrast radiography, contra-indications should be noted. Preparation involved with alternative imaging techniques should be considered for each case, eg enemata prior to gastro-intestinal procedures. Appropriate infection control procedures should be in place throughout any of the procedures listed. An awareness of professional responsibility as a registered veterinary nurse involving radiographic procedures and maintaining professional conduct to include recognition of duties and professional competence.

Outcome 4

The content of this Outcome represents a developing field and care should be taken to include the most up-to-date information without making the delivery highly technical and therefore inaccessible to candidates. The principles of each imaging technique to include, endoscopy, digital imaging, ultrasonography, magnetic resonance imaging and nuclear scintigraphy together with explanations of the principles, technical details, specialist equipment required, clinical applications and health and safety details where appropriate to be considered. Students should be able to explain why the Veterinary Surgeon has chosen this method of imaging.

Guidance on the delivery of this Unit

This Unit has been devised with the intention that it forms part of the core framework of the HND in Veterinary Nursing and should be delivered with that in mind.

Guidance on the assessment of this Unit

Centres should feel free to adopt an appropriate assessment strategy provided that it meets the specifications given in the Statement of Standards for this Unit.

Assessment Guidelines

Outcome 1

The assessment of this Outcome can be combined with Outcome 2, details of which are given under Outcome 2.

Outcome 2

The assessment of this Outcome can be combined with Outcome 1. This could be conducted as a closed-book holistic written test consisting of structured questions undertaken in controlled conditions and lasting one hour.

Outcome 3

The assessment could be conducted as a one and a half hour closed-book written test consisting of structured questions.

Outcome 4

The assessment of this Outcome could be an open-book investigation and an associated written report consisting of text and diagrams where appropriate. The report could be undertaken in the candidate's own time.

Online and Distance Learning

If this Unit is delivered by open or distance learning methods, additional resources will be required for candidate support, assessment and quality assurance. For further information and advice, please refer to the SQA guide: *Assessment and Quality Assurance for Open and Distance Learning* **(www.sqa.org.uk)**.

Opportunities for developing Core Skills

There are several opportunities to develop the Core Skill of *Information and Communication Technology (ICT)* at level 5 and the Written Communication and Using Number components of *Communication* and *Numeracy* at level 5 in this Unit.

In Outcome 3 there are opportunities to develop Using Number at level 5 in calculations of exposure factors using radiographic formulae.

Outcome 4 offers opportunities to develop *ICT* and Written Communication at level 5 through the open-book investigation and written report.

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

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

General information for candidates

Unit title: Veterinary Nursing: Diagnostic Imaging Techniques

This Unit will provide you with the knowledge and understanding of the techniques used in veterinary radiography. The importance of the production of diagnostic quality radiographs with due regard to health and safety will be made clear. Although the Unit will focus on x-ray techniques, ultrasound, endoscopy and other recently introduced techniques will be included.

The Unit is organised into four Outcomes, covering the following topics:

- relevant health and safety legislation
- the principles of radiography
- techniques for producing a radiographic image
- the principles and application to veterinary diagnoses of ultrasound, endoscopy and other diagnostic imaging techniques.

Assessments for the Unit will consist of one closed-book written test taken in controlled conditions and lasting one hour, covering Outcomes 1 and 2.

Outcome 3 will consist of one closed-book written assessment consisting of structured questions and lasting one and a half hours.

Outcome 4 will be an open-book investigation and an associated written report consisting of text and diagrams where appropriate.

This Unit is included in the framework for the HND in Veterinary Nursing.