

<b>Title</b>	<b>Take radiographs of animals, and process</b>		
<b>Level</b>	<b>5</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	People credited with this unit standard are able to: prepare the x-ray machine and self for the procedure; position the patient following safety precautions, and take the x-ray image; identify the features which affect x-ray image and use a technique chart; maintain a darkroom and develop radiographs using manual technique; develop radiographs using automatic processing; and identify and store radiographs to be easily retrievable.
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<b>Classification</b>	Animal Care and Handling > Veterinary Nursing
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<b>Available grade</b>	Achieved
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## Guidance Information

- For credit, evidence must be in accordance with the statutory and industry requirements contained in the following documents.  
 Relevant and current National Animal Welfare Advisory Committee (NAWAC) Codes of Welfare and Codes of Recommendations and Minimum Standards, available at <http://www.maf.govt.nz>, under animal welfare.  
 Relevant New Zealand Veterinary Association (NZVA) standards, available from NZVA, PO Box 11-212, Manners Street, Wellington (<http://www.vets.org.nz>) including the current version of *BESTPRACTICE™ Companion Animal Practice Standards (Section 6 – Radiology)*.  
 Animal Welfare Act 1999, Health and Safety in Employment Act 1992, Radiation Protection Act 1965, Radiation Protection Regulations 1982, and any subsequent amendments.  
 National Radiation Laboratory (NRL) C21 – *Code of Safe Practice for the Use of X-rays in Veterinary Diagnosis (2005)*.
- Underpinning Knowledge  
 The following areas of knowledge underpin performance of the elements in this unit standard:
  - Outcome 1
  - Structure and function of x-ray machine, production of x-rays
  - Nature and characteristics of x-rays
  - Scattered radiation
  - Types of x-ray machines and their uses
  - Radiographic film, types, size, structure of radiographic film and screens, intensifying screens
  - Types, care, and maintenance of cassettes and grids

Types of X-ray beam collimators  
 Care and maintenance of intensifying screens  
 Safe storage of films

#### Outcome 2

Standard anatomical directional terms  
 Use of ancillary equipment to assist patient positioning  
 Radiation safety and regulations  
 Personal monitoring and monitoring records  
 Position, labelling requirements for radiographs to be sent and scored on NZVA, Hip Dysplasia (HD) or Elbow Dysplasia (ED) Schemes

#### Outcome 4

Darkroom design, ventilation, lighting, safety features, structure of walls, wet/dry areas  
 Equipment found in darkroom  
 Precautions for use of and health regards of developing and fixing solutions  
 Methods of checking darkroom for processing or film store faults

#### Outcome 5

Precautions for use of and health hazards of developing and fixing solutions especially Gluteraldehyde

#### Outcome 6

NZVA regulations regarding ownership of radiographs and their legal importance.

## Outcomes and performance criteria

### Outcome 1

Prepare the x-ray machine and self for procedure.

#### Performance criteria

- 1.1 Cassette and film are selected and placed according to size of animal and area required to be radiographed, and suitable identification marking of film is selected.
- 1.2 Patient size and area to be radiographed are assessed and adjustments made to machine settings and adjustments.
- Range use of grid, exposure factors.
- 1.3 Machine settings are selected and set depending on size of animal and area to be radiographed with reference to a technique chart to determine correction factors.
- Range kilo voltage (kV), milliamperes (mA), exposure times, exposure charts.
- 1.4 X-ray beam is coned down using collimator to the minimum required to produce a radiograph suitable for interpretation.

1.5 Protective gear and monitoring devices are worn by all personnel in radiography room to protect from x-ray beams in accordance with NZVA *Companion Animal Practice Standards (Section 6 – Radiology)*.

Range gloves, apron, thyroid guard, protective goggles, radiation monitoring device.

1.6 Warning systems are activated, in accordance with NZVA *Companion Animal Practice Standards (Section 6 – Radiology)* to alert personnel and public prior to and during exposure.

## Outcome 2

Position the patient following safety precautions, and take the x-ray image.

### Performance criteria

2.1 Animal is prepared according to process and restrained to facilitate accurate imaging.

Range mechanical, manual, chemical.

2.2 Patient is positioned as directed by the veterinarian, using restraining aids as required, to enable the area for x-raying to be clear and easily interpreted, and to ensure there is no movement of patient at time of exposure.

Range free from foreign materials, as close to cassette as possible, in middle of x-ray cassette, correct side down if lateral view.

2.3 Cassette is identified in terms of name, number, left, right, or other sides as required.

2.4 Precautions are taken, according to NZVA *Companion Animal Practice Standards (Section 6 – Radiology)*, to minimise radiation dose to staff and patient.

Range non-repetition of radiographs, use of collimator, fast film, instructions to assistants, minimum number of personnel in room at time of exposure, personal safety check, age of personnel, pregnancy status of personnel.

## Outcome 3

Identify the features which affect x-ray image and use a technique chart.

### Performance criteria

3.1 Faults associated with each step are identified in terms of producing a poor image.

Range film detail, film density, film contrast, artefacts, movement.

3.2 The effects of adjusting exposure factors are explained in terms of quality of image.

Range focal-film distance, kilo voltage (kV), milliamperage (mA) and exposure time (s), line voltage (LV), film speed, screen types, use of grids.

3.3 A technique chart is developed for the individual machine showing settings for regions of the body and tissue thicknesses.

#### **Outcome 4**

Maintain a darkroom and develop radiographs using manual technique.

#### **Performance criteria**

4.1 Protective clothing is worn when handling solutions according to type of solution used.

Range goggles/face shield, rubber gloves, protective overalls, mask.

4.2 Equipment and fluids are checked and adjusted to ensure optimum state for processing.

Range supply, temperature, mix.

4.3 Film is prepared, and placed in developing tank for time according to temperature of developer and according to darkroom safety procedures.

4.4 Cassette is reloaded, avoiding damage to intensifying screen inside the cassette.

4.5 Film is washed, fixed, rewashed, and air dried to a state suitable for storage.

4.6 Factors affecting poor image are identified in terms of the developing process.

Range static, poor maintenance of wet/dry areas, incorrect temperature of solutions, incorrect developing and fixing times, light leaks, incorrect safe light, expired solutions.

4.7 Processing tanks and fluids are maintained and fluids replenished or disposed of according to manufacturer's instructions.

#### **Outcome 5**

Develop radiographs using automatic processing.

#### **Performance criteria**

5.1 Darkroom is maintained to ensure films develop to a high quality.

Range cassettes, intensifying screens, film storage, maintenance of machine especially rollers, processing tank, maintenance of fluids.

5.2 Protective clothing is worn when handling solutions according to type of solution used.

Range goggles/face shield, face mask with air filter, rubber gloves, protective overalls.

5.3 Film is processed according to manufacturer's instructions.

### Outcome 6

Identify and store radiographs to be easily retrievable.

### Performance criteria

6.1 Radiographs are permanently identified according to NZVA *Companion Animal Practice Standards (Section 6 – Radiology)*.

Range lead letters, graphite tape, photographic marker.

6.2 Radiographs are stored to prevent deterioration and are easily retrieved.

Range dry, free of excessive dust and light, easily identified, stored upright, logically filed.

**This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.**

### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	8 August 1996	31 December 2022
Revision	2	16 November 1998	31 December 2022
Revision	3	7 June 2000	31 December 2022
Rollover and Revision	4	25 June 2007	31 December 2022
Review	5	22 October 2020	31 December 2022

<b>Consent and Moderation Requirements (CMR) reference</b>	0228
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.