



# **RADIATION SAFETY ACT**

## **Chiropractic Radiation Safety Examinations**

### **General Information**

The Western Australian Radiation Safety Act and regulations require that any chiropractor wishing to operate x-ray equipment or to employ a medical imaging technologist to operate chiropractic x-ray equipment on their behalf must hold a licence under the Act.

Prerequisites for a licence include:

- being registered in the chiropractic profession by the Australian Health Practitioner Regulation Agency (AHPRA); and
- passing the Radiological Council's chiropractic x-ray examinations.

The examinations are divided into two sections:

- the **restricted examination**, which is applicable to candidates requiring a licence for radiography of the spine and pelvis only; and
- the **extended examination**, which is applicable to candidates who also wish to perform radiography of the thorax and extremities.

Chiropractic graduates of RMIT Bundoora's chiropractic course (after 1981), Macquarie University's chiropractic course (in or since 1990) or Murdoch University's chiropractic course (in or since 2014) are exempt from the restricted examination.

Applicants are not required to apply for a licence under the Radiation Safety Act until the examination has been passed.

### **Examination Criteria**

Candidates must:

- be registered in the chiropractic profession by AHPRA; or
- be in the final year of a chiropractic course recognised by AHPRA and written proof of that fact is provided.

The results of the examination will be made available to candidates following the Radiological Council's review of candidates' papers and the examiners' report. Any application for a licence to practice chiropractic radiography after the results are released will not be considered until the applicant is registered with AHPRA.

RMIT, Murdoch and Macquarie graduates who satisfy Council's requirements for exemption from the restricted examination, or students of those two institutions who are in the final year of their course, may apply to sit the extended section of the examination.

Candidates should note the following examination criteria:

- at least three of the five parts of the restricted examination (or two of the four parts of the extended examination) must be passed before a candidate can carry credits forward to the next examination;
- in addition, all parts of either the restricted or the extended examination must be passed within three consecutive examinations; and
- a pass in any part can only be carried forward to the following two consecutive examinations.

**The pass mark for each part of the examination is 70%.**

The requirements for a restricted licence must be satisfied before an extended licence will be granted by Council.

## Examination Format

### Restricted Examination (Spine & Pelvis only)

- Part I: A written paper relating to syllabus items 1, 2, 3, 4, 5 and 7. Candidates not achieving the required 70% pass mark but obtaining between 60-69% will be offered an oral examination following their practical examination.
- Part II: A written image review paper relating to syllabus item 6(b) – Spine & Pelvis.
- Part III: A written image review paper relating to syllabus item 6(c) – Spine & Pelvis.
- Part IV: An oral image review section. Candidates will be asked to view and comment on images relating to syllabus item 6(a).
- Part V: A practical section. The candidate will be asked to position a model for a minimum of two views relating to spine and pelvis radiography – syllabus items 4, 5 and 7.

Candidates may be asked to explain and justify the exposure techniques used for each projection including the choice of:

Film-screen combination  
Tube voltage (kVp)  
Tube current (mA)  
Time or mAs  
Collimation  
Centring points  
Gonad protection  
Immobilisation  
Differential filtration etc.

### Extended Examination (Thorax & Extremities)

- Part I: There is no Part I for the extended examination.
- Part II: A written film review paper relating to syllabus item 6(b) - Thorax and its contents, and extremities.
- Part III: A written film review paper relating to syllabus Item 6(c) - Thorax and its contents, and extremities.
- Part IV: A combined practical radiography section and oral film review section as follows:
- (i) The candidate will be asked to position a model for a minimum of two views, one each of the thorax and its contents and extremities.
  - (ii) The candidate will be asked to view and comment on radiographs relating to syllabus item 6(a).

## Chiropractic X-ray Examination Syllabus

As specified in Regulation 5 of the Radiation Safety (Qualifications) Regulations 1980.

### 1. Properties and use of radiation

Properties of x-rays for diagnostic radiography use. Filtration; HVL; absorption and scatter; inverse square law; ionisation; shielding.

### 2. Production, detection and measurement of radiation

Production of x-rays and x-ray spectra from diagnostic x-ray apparatus. X-ray machine controls and their functions. Rotating anode x-ray tubes; housings; collimators; focal spot sizes and heat ratings. Radiation units for exposure, absorbed dose and dose equivalent. Radiation detection and measurement methods by instrumentation, film and film-screen combinations.

### 3. Biological effects of radiation

Stochastic and deterministic effects. Somatic and hereditary effects. Equivalent and effective dose. Tissues at risk from radiation exposure and related risk factors. Effective Dose Limits for occupationally-exposed persons and the general public. Occupational and diagnostic x-ray exposure of pregnant women. Typical x-ray doses from diagnostic radiography and their significance.

### 4. Circumstances which may give rise to radiation hazards and means of protecting persons from these hazards

Improper setting up of the x-ray machine for radiography and the significance of kVp, mA, time, filtration, source to image distance (SID), object-image receptor distance, tube foci, grids and their use, cassettes, processing. Incorrect use or faults with the x-ray machine, grids, buckys, cassettes, processing and patient positioning. Radiation exposure of women of reproductive age and children. Gonad shielding. Radiation protection for patient, operator and assistant.

### 5. Theory and practice of production of radiographs for diagnostic purposes

Minimum requirements for the x-ray generator; light beam collimator; filtration; x-ray tube; bucky; grid immobilising devices; image identification; x-ray register; patient and operator protection; and processing facilities.

Cassettes. Moving and stationary grids; ratio, focus, clean-up, construction, effect on exposure; air gap techniques; magnification and distortion, collimation; scatter. Image; detail, contrast, density, latitude. Selection of optimum radiographic projections for the particular area and suspected pathology. Selection of optimum exposure factors and techniques.

**6. Recognition of technical artefacts and normal anatomy and pathology of persons shown in images**

a) Recognition of technical artefacts on images such as:

- Film handling faults including but not restricted to, static, pressure marks, interleaving paper in cassette
- Intensifying screen/ cassette faults such as poor contact, dirt, light leaks, x ray and safelight fog
- Processing artefacts such as contaminated chemistry, roller pressure marks
- Grid cut-off
- Incorrect patient positioning and/or collimation, patient movement.

b) Recognition of normal anatomy on plain images (non-contrast media examinations) including:

- Skeleton and thorax
- Skeleton embryology & physiology
- Development of bone
- Radiological structural reference lines

c) Recognition of pathology processes (including trauma), anomalous and congenital defects on plain image (non-contrast media examinations)

**7. Measures to be taken to eliminate unnecessary exposure and to reduce dose from necessary exposure of persons submitted to radiation for diagnostic purposes**

These measures would be expected to include:

- A prior clinical examination to determine if radiography is necessary.
- Use of images taken previously at other clinics or hospitals to reduce the necessity for radiography.
- Collimation of the x-ray beam to the minimum area of interest.
- Gonad shielding where appropriate.
- Correct positioning of the patient with optimum exposure factors
- Optimised processing to minimise dose and avoid the likelihood of repeat radiographs.

**References which may assist candidates intending to sit for this examination:****a) Radiation protection references**

ICRP 33. Protection against ionizing radiation from external sources used in medicine. Annals of the ICRP, 9, 1. Oxford: Pergamon Press, 1982.

ICRP 34. Protection of the patient in diagnostic radiology. Annals of the ICRP, 9, 2/3. Oxford: Pergamon Press, 1982.

ICRP 103. 2007 recommendations of the International Commission on Radiological Protection. Oxford: Pergamon Press, 2007.

NHMRC 14. Recommendations for minimising radiological hazards to patients. National Health and Medical Research Council Radiation Health Series, 14. Canberra: Australian Government Publishing Service, 1985.

NHMRC 39. Part 1: Recommendations for limiting exposure to ionizing radiation. Part 2: National standard for limiting occupational exposure to ionizing radiation. National Health and Medical Research Council Radiation Health Series, 39. Canberra: Australian Government Publishing Service, 1995.

Radiation Safety Sub-Committee of the Royal Australian College of Radiologists. 'Position statement on diagnostic radiology during pregnancy'. Australasian Radiology 31/4 (1987), 341. (Copies available from Radiation Health.)

Radiation Safety (General) Regulations 1983. Perth: Government Printer, 1983.

**b) Other references**

Appropriate textbooks as used at RMIT, Murdoch and Macquarie in the areas of radiography, anatomy, pathology, x-ray physics etc.

**Contact Us**

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