

# **Code of Practice for Dental Radiology**

---

Draft for consultation

Citation: Ministry of Health. 2016. *Code of Practice for Dental Radiology: Draft for consultation*. Wellington: Ministry of Health.

Published in October 2016  
by the Ministry of Health  
PO Box 5013, Wellington 6140, New Zealand

ISBN 978-0-947515-81-2 (online)  
HP 6513

This document is available at [health.govt.nz](http://health.govt.nz)



MANATŪ HAUORA



This work is licensed under the Creative Commons Attribution 4.0 International licence. In essence, you are free to: share ie, copy and redistribute the material in any medium or format; adapt ie, remix, transform and build upon the material. You must give appropriate credit, provide a link to the licence and indicate if changes were made.

---

# Contents

|   |           |
|---|-----------|
| <b>Introduction</b>   | <b>1</b>  |
| Purpose   | 1         |
| Scope   | 1         |
| Commencement  | 1         |
| Exemptions  | 1         |
| Contact   | 1         |
| <b>Roles and responsibilities</b>                               | <b>2</b>  |
| <b>Definitions</b>  | <b>3</b>  |
| <b>Managing entity</b>  | <b>5</b>  |
| General   | 5         |
| Facilities  | 5         |
| Equipment   | 6         |
| Training  | 7         |
| Radiological procedures   | 7         |
| Accident prevention and mitigation                              | 8         |
| Local rules and protocols                                       | 8         |
| Records   | 9         |
| <b>Dental practitioner</b>                                      | <b>10</b> |
| General   | 10        |
| Justification   | 10        |
| Optimisation of protection and safety                           | 11        |
| <b>Other parties</b>  | <b>13</b> |
| Manufacturer/supplier   | 13        |
| Worker  | 13        |
| Servicing engineer  | 14        |
| <b>Appendix 1: Equipment</b>                                    | <b>15</b> |
| Part 1: Radiological equipment                                  | 15        |
| Part 2: Ancillary equipment                                     | 16        |
| <b>Appendix 2: Dose limits</b>                                  | <b>17</b> |
| Occupational exposure   | 17        |
| Public exposure   | 17        |
| <b>Appendix 3: Cross-reference to Radiation Safety Act 2016</b> | <b>18</b> |
| <b>Submission form</b>  | <b>20</b> |

|                        |    |
|------------------------|----|
| Your details           | 20 |
| Additional information | 20 |
| Privacy                | 20 |
| Consultation questions | 21 |

---

# Introduction

## Purpose

This Code of Practice for Dental Radiology (code) is issued by the Director for Radiation Safety (the Director) under section 86 of the Radiation Safety Act 2016 (the Act). Its purpose is to set out the technical requirements necessary to comply with the fundamental requirements in sections 9 to 12 of the Act. Appendix 3 sets out cross-references between clauses in this code and those fundamental requirements. The requirements in this code do not limit the general nature of the fundamental requirements.

## Scope

This code applies to all activities associated with radiological equipment used for intra-oral, panoramic and cephalometric dental procedures. *ORS C1: Code of Practice for Diagnostic and Interventional Radiology* deals with dental procedures involving cone beam computed tomography. Activities can include manufacturing, possessing, controlling, managing, using, transporting, storing, exporting, selling, supplying and disposing of equipment.

Compliance with the code does not imply compliance in related areas such as health practitioner clinical competence, occupational safety, hazards in the workplace, resource management and transport of hazardous substances.

## Commencement

This code comes into force on 7 March 2017.

## Exemptions

The Director may exempt a person from a provision in the code under section 86(3) of the Act if satisfied that:

1. it is not practicable in the circumstances for the person to comply with the provision
2. compliance with the fundamental requirement to which the provision relates can be achieved in another way (see Appendix 3 for the fundamental requirements of the Act to which clauses in the code relate).

## Contact

The Director's contact details are:

Office of Radiation Safety  
PO Box 3877  
Christchurch 8140

Phone: 03 974 2358  
Fax: 03 372 1015  
Email: [orsenquiries@moh.govt.nz](mailto:orsenquiries@moh.govt.nz)

---

# Roles and responsibilities

The following individuals and bodies have roles and responsibilities in relation to this code.

**Managing entity** – the legal entity that manages or controls radiation sources. This could be, for example, a district health board, company, partnership, trust or individual person. The managing entity is responsible for setting up and implementing the technical and organisational requirements for the protection and safety of the practices and sources for which they hold a source licence.

**Manufacturer/supplier** – the person who designs, manufactures, produces, constructs, assembles, installs, distributes, sells, exports or imports radiological equipment or develops software that could influence the delivery of the medical exposure.

**Dental Practitioner** – a health practitioner with specialist education and training in the dental uses of radiation who is competent to perform independently and oversee dental radiological procedures. This could include, for example, a dentist, dental specialist, dental therapist, dental hygienist or orthodontic auxiliary.

**Referring practitioner** – a health practitioner who is approved by the managing entity to refer individuals to a dental practitioner for medical exposure.

**Servicing engineer** – a person who has expertise in installing, servicing and maintaining radiological equipment. Although this person's activities will normally require them to hold a user licence under the Act, such a licence is granted on the basis that the person can safely use the equipment. The managing entity must separately assess their competence as a servicing engineer.

**Ethics Committee** – the committee that approves programmes of biomedical research, including, in particular, the justification of medical exposure of volunteers.

---

# Definitions

The defined terms given in **bold** have the following meanings.

**Accident** – any unintended event, including operating errors, equipment failures and other mishaps, the consequences or potential consequences of which are not negligible from the point of view of protection and safety. In the case of medical exposures arising from radiological procedures, these include exposure of the wrong individual, tissue or organ; substantially greater exposure than intended; inadvertent exposure of the embryo or fetus; and fault of **radiological equipment**, failure of software or system failure, or error, mishap or other unusual occurrence with the potential for subjecting the patient to a medical exposure that is substantially different from what was intended.

**Ancillary equipment** – equipment other than **radiological equipment** or **protective equipment** that has an impact on the successful outcome of a **radiological procedure** such as automatic film processors, image receptors, view boxes and equipment used for digital image display.

**Comforter/carer** – a person who voluntarily helps other than occupationally in caring for, supporting and comforting a patient undergoing a **radiological procedure**.

**Diagnostic reference level** – a level established by the Director following consultation that is used to indicate whether, in routine conditions, the dose to the patient in a specified radiological procedure is unusually high or unusually low for that procedure.

**Dose limit** – limits on **effective dose** and **equivalent dose** specified in Appendix 2.

**Effective dose** – the tissue-weighted sum of **equivalent doses** in all specified tissues and organs of the body.

**Equivalent dose** – the radiation-weighted dose in a tissue or organ of the body.

**Emergency** – any non-routine situation that necessitates prompt action, primarily to mitigate actual or perceived hazards or adverse consequences for human health and safety, quality of life, property or the environment. This includes radiological emergencies and conventional emergencies such as fires, release of hazardous chemicals, storms or earthquakes.

**Facility** – the location where **radiological** and **ancillary equipment** is installed, used, handled or stored.

**Health Practitioner** – an individual who is, or is deemed to be, registered with an authority as a practitioner of a particular health profession under the Health Practitioners Competence Assurance Act 2003.

**In-room protective device** – device or equipment to reduce a person's exposure to radiation but the person does not wear it, such as ceiling-suspended protective screens, protective lead curtains, mobile shields and disposable protective drapes.

**Justify** – determine that the expected benefits to individuals and to society from a radiological procedure outweigh the harm resulting from that procedure. 'Justifies', 'justified' and 'justification' have corresponding meanings.

**Medical exposure** – exposure to ionising radiation experienced by patients for the purposes of medical or dental diagnosis, by **comforters/carers** while caring for, supporting or comforting patients undergoing **radiological procedures**, and by volunteers in a programme of biomedical research.

**Member of the public** – for purposes of protection and safety, any individual in the population except when subject to **occupational exposure** or **medical exposure**.

**Occupational exposure** – exposure of **workers** incurred in the course of their work.

**Occupationally exposed person** – any person who is subject to **occupational exposure**.

**Optimise** – the process of determining what level of protection and safety would result in the magnitude of individual doses, the number of individuals (**workers** and **members of the public**) subject to exposure and the likelihood of exposure being as low as reasonably achievable, economic and social factors being taken into account. For medical exposures of patients this is the management of the radiation dose to the patient commensurate with the medical purpose. ‘Optimises’, ‘optimised’ and ‘optimisation’ have corresponding meanings.

**Patient** – an individual who is subject to medical exposure as the recipient of a radiological procedure except as part of a programme of biomedical research.

**Personal protective equipment** – equipment a person wears to reduce their exposure to radiation, such as protective aprons, organ shields, protective eye-wear and protective gloves.

**Potential exposure** – possible future exposure that may result from an anticipated operational occurrence or accident at a source or due to an event or sequence of events of a probabilistic nature, including equipment faults and operating errors.

**Protection and safety** – the protection of people against exposure to ionising radiation, the safety of radiation sources, the prevention of accidents and the mitigation of consequences of accidents if they do occur.

**Protective equipment** – **personal protective equipment** and **in-room protective devices**.

**Public exposure** – exposure to ionising radiation that a member of the public experiences, but excluding any **occupational exposure** or **medical exposure**.

**Radiological emergency** – an emergency in which there is, or is perceived to be, a hazard due to radiation exposure.

**Radiological equipment** – equipment, including its associated software, used to produce X-rays.

**Radiological procedure** – a procedure involving the use of **radiological equipment** for intra-oral, panoramic and cephalometric dental procedures.

**Typical dose** – the median or average of the doses for a representative sample of relatively standard-sized patients, at clinically acceptable image quality.

**Volunteer** – an individual who may be subjected to medical exposure as part of a programme of biomedical research.

**Worker** – an individual who works, whether full time, part time or temporarily for the managing entity and who has recognised rights and duties in relation to occupational radiation protection.



---

# Managing entity

## General

1. The managing entity must:
  - (a) take overall responsibility for protection and safety at the facility
  - (b) fully document any delegation of the responsibility in clause 1(a) and ensure the delegate is authorised, capable and resourced sufficiently to carry out those delegations
  - (c) establish a management system that enhances protection and safety by:
    - (i) effectively integrating protection and safety into the overall management system of the organisation
    - (ii) making a commitment to protection and safety from the highest level of management at the facility, including by providing all required resources
    - (iii) promoting continuous improvement and a safety culture
  - (d) ensure that:
    - (i) all activities associated with radiological equipment are justified and optimised for protection and safety
    - (i) dose limits for occupational and public exposure are not exceeded as a result of those activities.

## Facilities

2. The managing entity must:
  - (a) provide facilities that:
    - (i) are sited, located, designed, manufactured, constructed, assembled, commissioned, operated, maintained and decommissioned in accordance with good engineering practice, and minimising the need to rely on administrative controls and personal protective equipment for protection and safety
    - (ii) enable the practitioner to perform duties during a radiological procedure using fixed units that are either (a) further than 2 metres from the X-ray tube head and the patient or (b) behind shielding of at least 18-millimetre gypsum plasterboard equivalence
    - (iii) enable the practitioner to clearly observe and communicate with the patient at all times during the radiological procedure
    - (iv) provide ways for properly displaying and interpreting radiographs and, if film radiography is performed, for properly processing films
    - (v) are shielded if cephalometry is performed with at least 2-millimetre lead equivalence to intercept the primary X-ray beam before it reaches regularly occupied areas to which the practitioner does not control access

- (a) verify and document the adequacy of the structural shielding of new facilities before they are used clinically, when the intended use of a room changes, radiological equipment is upgraded, underlying procedures or patient workload changes, or surrounding room occupancy is altered

## Equipment

### 3. The managing entity must:

- (a) provide, maintain, test and regularly service radiological equipment, protective equipment and ancillary equipment so that it:
  - (i) is fit for its intended purpose
  - (i) fulfils its design requirements for protection and safety
- (b) withdraw radiological equipment from use if it cannot achieve typical doses below diagnostic reference levels
- (c) prevent radiological equipment designed for intra-oral procedures from being used for cephalometry
- (d) prevent the use of handheld portable radiological equipment unless it is impractical or medically unacceptable to transfer patients to a fixed or mobile unit
- (e) ensure that:
  - (i) radiological equipment and ancillary equipment meet the requirements in Appendix 1
  - (ii) protective equipment keeps its shielding integrity
- (f) maintain an accurate inventory of all radiological equipment, including its location, details and unique identifying information
- (g) maintain a record of maintenance for each item of radiological equipment, including a fault log and remedial actions taken (interim and subsequent repairs), the results of testing before an item is reintroduced to clinical use, and any reports from servicing engineers
- (h) take all reasonable steps to prevent damage or unauthorised access to, or loss of radiological equipment
- (i) transfer management and control of radiological equipment only to people who are authorised to assume management and control under the Radiation Safety Act 2016.
- (j) ensure that a servicing engineer measures the physical parameters of radiological equipment, including calibration of output in terms of appropriate quantities using internationally accepted protocols:
  - (i) at the time it accepts and commissions the equipment, before dental practitioners use it clinically
  - (i) periodically after that first check, but at least every four years
  - (ii) after any major maintenance procedure that could affect protection and safety of patients
  - (iii) after installing any new software or modifying any existing software that could affect the protection and safety of patients.

# Training

4. The managing entity must:
  - (a) ensure that all persons with responsibilities for protection and safety:
    - (i) are appropriately specialised and qualified and have continuing education and training so that they can perform their duties competently, including responsibilities for radiation protection of patients
    - (i) receive adequate information on health risks due to occupational exposure in normal operation, anticipated operational events and accident conditions
    - (ii) understand their roles, responsibilities and functions as they relate to protection and safety
  - (b) document all education and training under clause 4(a)(i)
  - (c) communicate decisions to workers regarding protection and safety
  - (d) provide workers who may enter controlled areas with appropriate information on risk to the embryo or fetus when a pregnant woman is exposed to radiation, and on the importance of advising the managing entity if a worker thinks she may be pregnant.

# Radiological procedures

5. The managing entity must prevent anyone from conducting radiological procedures for any purpose other than dental diagnosis
6. For each radiological procedure, the managing entity must ensure that:
  - (a) a radiological practitioner takes overall responsibility for protection and safety including justification and optimisation of protection and safety
  - (a) any delegation of a radiological practitioner responsibility is documented
  - (b) sufficient medical personnel are available to successfully perform the procedure
  - (c) all persons performing functions are:
    - (i) authorised by the managing entity for the specific radiological equipment to be used
    - (ii) permitted to perform those functions under the Health Practitioners Competence Assurance Act 2003
    - (iii) authorised as necessary under the Radiation Safety Act 2016.
  - (d) patients are subject to medical exposure only if:
    - (i) the procedure has been requested by a referring practitioner and information on the clinical context has been provided, or it is part of a health screening program
    - (ii) the procedure has been justified by the radiological practitioner in consultation as appropriate with the referring practitioner, or it is part of a health screening program
    - (iii) the patient or the patient's legal representative has been informed of the expected diagnostic benefits as well as the risks

- (e) volunteers are subject to medical exposure only if:
  - (i) the medical exposure has been approved by an ethics committee
  - (i) dose constraints and other conditions imposed by the ethics committee are satisfied
- (f) comforters and carers are subject to medical exposure only if they have received, and indicated an understanding of, relevant information on radiation protection and on the radiation risks

## **Accident prevention and mitigation**

7. The managing entity must:
- (a) take all practicable steps to minimise the likelihood of accidents including, commensurate with the likelihood and magnitude of potential exposures, a multilevel system of sequential, independent provisions for protection and safety
  - (b) take timely action to mitigate the consequences of any accident that does occur
  - (c) promptly investigate any accident, including by:
    - (i) calculating or estimating doses a person has received and, if applicable, the dose distribution within them
    - (i) identifying corrective actions required to prevent a recurrence
  - (b) implement all corrective actions identified in clause 7(c)(ii)
  - (c) keep a written record of the accident, including the:
    - (i) cause
    - (i) calculations made under clause 7(c)(i)
    - (ii) corrective actions identified under clause 7(c)(ii)
    - (iii) details of the implementation of corrective actions under clause 7(d)
  - (d) promptly notify the Director if the accident results in a significant unintended or accidental exposure.

## **Local rules and protocols**

8. The managing entity must maintain and publish written protocols:
- (a) to establish appropriate communication between individuals involved in referring patients and in justifying and authorising procedures to ensure those procedures have more beneficial effects than harmful ones
  - (b) to correctly identify patients and the procedures they are to undergo
  - (c) to ensure the timely reporting of incidents
  - (d) to report equipment faults
  - (e) to minimise unnecessary irradiation of any embryo or fetus
  - (f) for operating parameters specific to each piece of radiological equipment that is used for common diagnostic radiological procedures, including size-specific written protocols for children

- (g) for all actions that indirectly affect radiation safety and diagnostic quality
- (h) for possibly pregnant staff
- (i) for all quality-control tests, including frequency and tolerance limits
- (j) for monitoring staff doses and investigating doses that are above investigation levels
- (k) to be followed by unlicensed users working under written instructions in line with section 21(4)(b) of the Act
- (l) to ensure staff use protective equipment when structural shielding and administrative controls alone cannot provide the required level of occupational radiation protection.
- (m) implement corrective actions (including a review of imaging procedures) if typical actual doses are above the diagnostic reference levels, or if typical doses fall substantially below those levels and the exposures do not produce the expected medical benefits.

## Records

9. The managing entity must maintain adequate records of:
  - (a) delegation of responsibilities of the managing entity (clause 1(a)) and the radiological practitioner (clause 6(b))
  - (b) training (clause 4(b))
  - (c) results of calibrations and periodic checks of physical and clinical parameters (clause 21(g))
  - (d) patient details and medical records for radiological procedures, and exposure records for volunteers subject to medical exposure as part of a programme of biomedical research (clause 10(g))
  - (e) investigations of unintended or accidental medical exposures (clause 7(e))
  - (f) shielding in the facility (clause 2(b))
  - (g) inventory and maintenance of radiological equipment (clause 3(f) and (g))
  - (h) exemptions from this code granted under section 86(3) of the Act.

---

# Dental practitioner

## General

10. The dental practitioner must:
  - (a) take overall responsibility for protection and safety related to radiological procedures
  - (a) comply with local rules and protocols that the managing entity sets
  - (b) report any faults or other irregularities to the managing entity using the protocol that the managing entity sets
  - (c) only use radiological equipment that is fit for its purpose, the most appropriate available and designed for its purpose
  - (d) stop using equipment if it has a fault that reduces protection and safety
  - (e) report accidents to the managing entity using the protocol that the managing entity sets
  - (f) keep appropriate records of patient and volunteer details and medical records for radiological procedures.

## Justification

11. Before starting a radiological procedure, the radiological practitioner must in consultation as appropriate with the referring practitioner, justify the medical exposure taking into account, in particular for paediatric or possibly pregnant patients:
  - (a) the appropriateness of the request
  - (b) the urgency of the radiological procedure
  - (c) the characteristics of the medical exposure
  - (d) the characteristics of the individual patient
  - (e) relevant information from the patient's previous radiological procedures and clinical history
  - (f) relevant national or international referral guidelines.
12. Clause 11 does not apply to radiological procedures that the Ethics Committee has justified or that are part of an approved health screening programme.

13. If the procedure involves an asymptomatic individual for early detection of disease (but not as part of an approved health screening programme), the radiological practitioner must, in addition to satisfying the justification requirements above:
  - (a) justify the procedure specifically for that individual:
    - (i) in consultation with the referring practitioner
    - (i) in accordance with guidelines of relevant professional bodies
  - (b) inform the patient in advance of the expected benefits, risks and limitations of the procedure.
14. For any radiological procedure involving a comforter/carer, the practitioner must:
  - (a) make reasonable enquiries to find out whether the comforter/carer is pregnant and prevent any person who is or may be pregnant from fulfilling this role
  - (b) fully inform the comforter/carer of the radiation risks and check that they understand
  - (c) ensure no part of the comforter/carer is exposed to the primary X-ray beam
  - (d) ensure that the comforter/carer wears a lead apron.

## **Optimisation of protection and safety**

15. The dental practitioner must ensure that operational aspects of optimisation of protection and safety for patients undergoing radiological procedures are implemented by:
  - (a) selecting radiological equipment that is fit for its purpose, the most appropriate available and designed for its purpose
  - (b) correctly identifying the patient and the procedure
  - (c) strictly limiting patient exposure to the area of clinical interest by collimating the beam when possible and, for intra-oral radiography, by positioning the end of the cone as close as possible to the patient's skin, and shielding radiosensitive organs that may be exposed when appropriate
  - (d) minimising the need for repeat procedures
  - (e) adopting equipment settings and features for the procedure that the managing entity has set or, if the managing entity has set no such requirements, applying settings and features that keep the dose to the patient as low as reasonably achievable to get the desired diagnostic information for which the procedure was undertaken
  - (f) using the most sensitive available film and intensifying screen combination to get satisfactory diagnostic results
  - (g) processing film properly so that the inherent quality of the latent image is not reduced.

16. The dental practitioner must keep doses arising from occupational exposure as low as reasonably achievable, including by:
  - (a) establishing a controlled area not less than 2 metres from the patient and the tube head during radiological procedures involving fixed units
  - (b) restricting access to the controlled area to only those who need to be there
  - (c) using comforters/carers in preference to radiation workers if a patient needs to be held or comforted during a radiological procedure
  - (d) ensuring no radiation worker is exposed to the primary radiation beam
  - (e) ensuring no radiation worker holds the tube head (except for procedures using handheld intra-oral radiological equipment) or image receptor during the exposure
  - (f) using protective equipment if a radiation worker must be within the controlled area
  - (g) maintaining barriers and shielded doors in a closed or protected position during exposures.
  
17. The dental practitioner must keep doses arising from public exposure as low as reasonably achievable by preventing members of the public from entering to controlled areas during a radiological procedure unless they need to be present as a comforter/carer.



---

# Other parties

## Manufacturer/supplier

18. The manufacturer/supplier of radiological equipment must:
  - (a) supply well-designed, well-manufactured and well-constructed radiological equipment that:
    - (i) provides for protection and safety in line with the requirements of this code
    - (ii) meets engineering, performance and functional specifications
    - (iii) meets quality standards appropriate to the significance of systems and components, including software, for protection and safety
    - (iv) provides clear displays, gauges and instructions on operating consoles in appropriate languages
  - (b) provide information in appropriate languages on how to properly install and use the radiological equipment and on its associated radiation risks, including performance specifications, instructions for operating and maintenance, and instructions for protection and safety
  - (c) supply all radiological equipment with all appropriate radiation protection tools as a default, rather than as optional extras.
19. The manufacturer/supplier must make suitable arrangements with managing entities to share information on use and operating experience that may be important for protection and safety.

## Worker

20. All radiation workers must:
  - (a) comply with this code and any local rules and protocols issued by the managing entity under clause 8
  - (b) cooperate with the managing entity over protection and safety
  - (c) provide information to the managing entity on their past and present work that is relevant for ensuring effective and comprehensive protection and safety for themselves and others
  - (d) accept information, instruction and training in protection and safety to enable them to comply with this code
  - (e) report circumstances that could reduce protection and safety to the managing entity.

# Servicing engineer

21. The servicing engineer must:
- (a) be licensed or otherwise authorised under the Radiation Safety Act 2016 for the work they are to do
  - (b) install and service radiological equipment competently so that it complies with the requirements in clause 3
  - (c) for newly installed, serviced or modified radiological equipment ensure that the setting of the image receptor sensitivity matches the sensitivity of the image receptor being used
  - (d) ensure that radiological equipment fitted with an object programmed exposure control is adjusted to match the speed of the image receptor in use
  - (e) ensure that all dosimeters used for dosimetry of patients and to measure the physical parameters of radiological equipment are calibrated at least every two years and that such calibrations are traceable to a standards dosimetry laboratory
  - (f) cooperate with the managing entity to ensure that radiological equipment cannot be used clinically while it is being installed or serviced
  - (g) after installing or servicing the equipment and before the equipment is used clinically, provide a written report to the managing entity:
    - (i) clearly identifying the equipment
    - (ii) describing the equipment fault (if any), the work done, parts replaced, adjustments made and any changes that may affect protection and safety
    - (iii) certifying that the radiological equipment complies with the relevant requirements in clause 3
    - (iv) for installation of new equipment, certifying that the installation enables the facilities to comply with clause 2(a)
    - (v) certifying that all radiation protection and safety features are in place and operating correctly
  - (h) collaborate with the managing entity after installation or servicing to ensure necessary quality control tests are completed successfully.

---

# Appendix 1: Equipment

## Part 1: Radiological equipment

### General

These requirements apply to all radiological equipment used in dental radiography. This radiological equipment requires:

1. hardware and software controls that minimise the likelihood of unintended or accidental medical exposures
2. devices that automatically terminate the irradiation after a pre-set time, tube current–exposure time product, or dose to the automatic exposure control detector, or when the ‘dead man’ hand switch is released
3. radiation beam control mechanisms, including devices that indicate clearly (visually and/or audibly) and in a fail-safe manner when the beam is ‘on’
4. when pre-set protocols are provided, technique factors that adequately trained personnel can readily access and modify
5. operating parameters for radiation generators, such as the generating tube potential, filtration, focal spot position and size, source-image receptor distance, field size indication and either tube current and time or their product, that are clearly and accurately shown
6. total filtration in the incident primary X-ray beam greater than 1.5-millimetre aluminium equivalence for equipment designed to be operated at tube potentials up to and including 70 peak kilovoltage (kVp), and greater than 2.5-millimetre aluminium equivalence above 70 kVp
7. leakage radiation at 1 metre from the focus less than 1 milligray per hour at every rating specified by the manufacturer for that tube in that housing
8. X-ray tube output coefficient of variation less than 0.1 for 5 or more consecutive exposures at the same setting
9. for radiological equipment where the exposure time is selected, X-ray tube output linear within 10 percent between two exposure time settings that do not differ by more than a factor of 4, with peak kilovoltage and milliamperage kept constant.

### Intra-oral

These requirements apply to all radiological equipment used in intra-oral radiography. This radiological equipment requires:

1. a minimum tube potential of 60 kVp
2. radiation output sufficient to obtain radiographs with exposure times of 1 second or less

3. an open-ended collimator providing a focus to skin distance of at least 20 cm and a field size at the collimator end of no more than 4 centimetres by 5 centimetres if rectangular, or 6 centimetres in diameter if cylindrical
4. for fixed intra-oral units, manoeuvrability at short focal distances around the head of the patient, and the tube head supported so that it remains stationary when positioned for radiography
5. for handheld portable units, a permanent backscatter shield protecting the operator's entire body
6. for handheld portable units, a permanent label in a prominent position with wording to the following effect: 'Danger – equipment produces X-rays when energised'.

## **Cephalometric**

These requirements apply to all radiological equipment used for cephalometric. This radiological equipment requires:

1. devices to precisely align the patient, image receptor and X-ray field
2. limitation of field size to the dimensions of the image receptor
3. field size at each focus to image distance for which it is used to be marked on the housing.

## **Panoramic**

These requirements apply to all radiological equipment used for panoramic radiography. This radiological equipment requires:

1. a permanent primary barrier equivalent to 2 millimetres of lead or more
2. the patient to be adequately restrained and held to minimise movement effects
3. provisions to vary the size of the focal trough so that it is possible to radiograph dentition of sizes typical of both children and adults
4. limitation of the field size to the dimensions of the receptor slit (if present) and the image receptor.
5. for panoramic dental systems, limitation of field size to the area required for diagnosis, by means of programmed field size trimming and 'child-imaging mode'.

## **Part 2: Ancillary equipment**

These requirements apply to all ancillary equipment used for dental radiography. This ancillary equipment requires:

1. digital images that are free of artefacts produced from ghosting of previous images or the loss of visually detectable pixels or any artefact that could be reasonably misinterpreted as a clinical feature
2. intensifying screens and cassettes that are maintained in clean condition, free of blemishes.

---

# Appendix 2: Dose limits

## Occupational exposure

1. For occupational exposure of workers over 18 years of age, the dose limits for ionising radiation are:
  - (a) an effective dose of 20 millisieverts (mSv) per year averaged over five consecutive years (100 mSv in five years) and of 50 mSv in any single year, or
  - (b) an equivalent dose to the lens of the eye of 20 mSv per year averaged over five consecutive years (100 mSv in five years) and of 50 mSv in any single year, or
  - (c) an equivalent dose to the extremities (hands and feet) or the skin of 500 mSv in a year.
  
2. For occupational exposure of people aged 16–18 years who are being trained for employment involving radiation, and for exposure of students aged 16–18 years who use ionising radiation sources in the course of their studies, the dose limits are:
  - (a) an effective dose of 6 mSv in a year, or
  - (b) an equivalent dose to the lens of the eye of 20 mSv in a year, or
  - (c) an equivalent dose to the extremities (hands and feet) or the skin of 150 mSv in a year.

## Public exposure

1. For public exposure, including exposure of an embryo or a foetus in a female worker, the dose limits for ionising radiation are:
  - (a) an effective dose of 1 mSv in a year, or
  - (b) an equivalent dose to the lens of the eye of 15 mSv in a year, or
  - (c) an equivalent dose to the skin of 50 mSv in a year.

---

# Appendix 3: Cross-reference to Radiation Safety Act 2016

As required by section 87(1) of the Radiation Safety Act 2016, clauses in this code apply to the fundamental requirements in sections 9–12 of the Act as follows.

| Section in Act | Clauses in code     |
|----------------|---------------------|
| 9(1)           | 1, 4–6, 8–14        |
| 9(2)           | 1–4, 6, 8–10, 15–21 |
| 9(3)           | 1–4, 6, 8–10, 20    |
| 10             | 1–4, 6–10, 18–21    |
| 11             | 1–4, 8–9, 20        |
| 12             | 1–4, 8–9, 20        |



---

# Submission form

## Your details

This submission was completed by: (name) \_\_\_\_\_

Address: (street/box number) \_\_\_\_\_

(town/city) \_\_\_\_\_

Email: \_\_\_\_\_

Organisation (if applicable): \_\_\_\_\_

Position (if applicable): \_\_\_\_\_

## Additional information

I am, or I represent an organisation that is, based in:

New Zealand     Australia     Other (please specify):

I am, or I represent, a: (tick all that apply)

- |  |  |
|--|--|
| <input type="checkbox"/> District health board   | <input type="checkbox"/> Private health provider           |
| <input type="checkbox"/> Professional body       | <input type="checkbox"/> Other institution, eg, university |
| <input type="checkbox"/> Health practitioner     | <input type="checkbox"/> Member of the public              |
| <input type="checkbox"/> Other (please specify): |  |

## Privacy

We may publish submissions on the Ministry's website. If you are submitting as an individual, we will automatically remove your personal details and any identifiable information.

If you do not want your submission published on the Ministry's website, please tick this box:

Do not publish this submission.

Your submission will be subject to requests made under the Official Information Act 1982. If you want your personal details removed from your submission, please tick this box:

Remove my personal details from responses to Official Information Act requests.

### Please return this form to:

Email: <mailto:orsenquiries@moh.govt.nz> (including 'radiology code' in the subject line)

or post: Office of Radiation Safety, PO Box 3877, Christchurch 8140



# Consultation questions

The Office of Radiation Safety is seeking comments on the following.

## Scope

1. The scope of the code relates to the use of X-rays for intra-oral, panoramic and cephalometric dental procedures. (Note this means a separate code for diagnostic and interventional radiology includes the increased requirements for the dental use of cone beam computed tomography equipment.) Is this appropriate?

Yes

No

If no, please provide alternative suggestions for the scope of this code.

## Roles and responsibilities

2. Are the roles and responsibilities of key parties adequately described?

Yes

No

If no, please provide details of parties that should or should not be included and any changes that should be made to the descriptions.

## Definitions

3. Are the definitions appropriate and comprehensive?

Yes

No

If no, please provide suggestions for any new terms to be defined or changes to existing definitions.

## Managing entity obligations

4. a. Are the subheadings in the 'Managing entity' section appropriate?

Yes

No

- b. Are there other changes you think are necessary to the obligations of the managing entity?

Yes

No

Please provide any comments below.

## Practitioner obligations

5. a. Are the subheadings in the 'Practitioner' section appropriate?
- Yes
- No
- b. Are there other changes you think are necessary to the obligations of the practitioner?
- Yes
- No

Please provide any comments below.

## Other parties

6. a. Are there other parties who should have defined responsibilities?
- Yes
- No
- b. Are there other changes you think are necessary to the obligations of other parties?
- Yes
- No

Please provide any comments below.

## Additional comments

7. a. Was the information in this code appropriately presented?
- Yes
- No
- b. Was the information in this code easy to find?
- Yes
- No
- c. Are there any changes to the way of presenting information you would like to suggest?
- Yes
- No
- d. Are there circumstances that are not included in this code but should be? If yes, please provide more details in the comments box below.
- Yes
- No
- e. Is the information presented in this code easy to understand?
- Yes
- No

f. Is there any other information or subject that should be included in this code?

Yes

No

Please provide any comments related to your answers to 7(a)–(f) below.