

Introduction

1. Previously, under S.I. 478 of 2002 – European Communities (Medical Ionising Radiation Protection) Regulations 2002 - the Dental Council held several health protection responsibilities in relation to the use of ionising radiation. In order to meet its obligations under the S.I., Council developed and published the following suite of guidance: -
 - *Clinical audit criteria*
 - *Protocols for standard radiological practice (amended)*
 - *Dose constraints for helpers*
 - *Diagnostic reference levels*
 - *Prohibition of vertex occlusal projections*
 - *Unlicensed products*
 - *Cone Beam Computed Tomography (CBCT) guidelines*
2. In January 2019, the European Union (Basic Safety Standards for Protection against danger arising from Medical Exposure to Ionising Radiation) Regulations 2018 were transposed as [S.I. No. 256 of 2018](#). This S.I. is referred to as the “BSSD” and was later amended by [S.I. No. 413 of 2019](#). The BSSD revoked the previous S.I. 478 of 2002. In April 2019, the Environmental Protection Agency (EPA) published its Code of Practice on the Application of the Ionising Radiation Regulations (IRR19) in Dentistry 2019. These developments significantly changed Council’s role in the area of radiation safety.
3. In the first instance, the BSSD confers significant powers and responsibilities on the Health Information and Quality Authority (HIQA) in the area of ionising radiation safety. Part 2 of the BSSD establishes requirements in relation to medical exposures including requirements for referrers, practitioners, justification of practices, justification of medical exposures, diagnostic reference levels and dose constraints for medical exposures.
4. Part 4 of the BSSD establishes requirements for undertakings in relation to education, information, and training. ‘Undertakings’ in this instance can be a person or a body. The key requirements as they relate to the Dental Council in Part 4 are summarised as follows: -
 - Undertakings must ensure that practitioners, and individuals to which practical aspects of radiological procedures are delegated, have adequate education, information, and theoretical and practical training, as well as relevant competence in, radiation protection. (*Section 22(1)*)
 - Practitioners and individuals with delegated duties must have successfully completed training, including theoretical knowledge and practical experience, in medical radiological practices and radiation protection, as prescribed by the Dental Council (or another body listed in the same section) having regard to the EC guidelines (Radiation Protection No. 175) (*Section 22(3)*)

- Undertakings shall ensure that practitioners and individuals with delegated duties undertake continuing education and training after qualification including, in the case of clinical use of new techniques, training related to these techniques and the relevant radiation protection requirements. (*Section 22(4)*)
5. The European guidelines referenced above, [*Radiation Protection No 175 - Guidelines on radiation protection education and training of medical professionals in the European Union*](#), establish core learning outcomes for radiation protection for health professionals, and includes additional learning outcomes for dentists. The annexed tables 3.1 and 3.2 in these European Guidelines provide recommendations regarding the minimum training requirements for dentists and other members of the dental team.

Council's role to prescribe training

6. Following the above, there is an obligation for Council to confirm its expectations of the minimum training that must be completed by those members of the dental team referred to in Section 22(1) of the BSSD. Section 22(3) of the BSSD is the legal basis for the information now being provided by Council.
7. The Dental Council acknowledges the value and primacy of a suite of European publications which underpin safe radiological education, training, and practice. The key document referenced in the BSSD is the *European Commission's Guidelines on Radiation Protection Education and Training of Medical Professionals in the European Union (Radiation Protection No. 175)*.
8. *Radiation Protection No. 175* itself makes further reference to two additional European publications which are particularly relevant to dental radiological practice and safety. The first of these is the [*European Commission's Guidelines on Radiation Protection in Dental Radiology \(Radiation Protection No. 136\)*](#). The second is the European Commission's publication on [*Cone Beam CT for dental and maxillofacial radiology \(evidence-based guidelines\) \(Radiation Protection No. 172\)*](#).
9. *Inter alia*, the three European Commission publications cited above include minimum learning outcomes for all healthcare professionals who work with ionising radiation, specific learning outcomes for dentists and valuable content underpinning safe dental radiographic practice.

Undergraduate dentistry

10. At the point of graduation, dentists are required to be competent in the use of, and familiar with the regulation of, ionising radiation. This is a European requirement reflected in both the BSSD and the Professional Qualifications Directive and is explicitly reflected as a series of learning outcomes in the Dental Council's requirements for undergraduate dentistry in Ireland.
11. It is acknowledged that the undergraduate dental curriculum in Ireland does not lead to a graduating competence in the use of Cone Beam CT. Further training post-qualification is required by dentists before the use of CBCT can be considered. Further information regarding the steps that must be taken and the quality benchmarks that must be observed is provided later in this document.

Selecting a training course

12. Individuals should satisfy themselves that any training course they are considering is directly and explicitly compatible with the minimum training content requirements and key learning objectives/outcomes confirmed in the three core European documents introduced above - 136, 172 and 175. Course providers should be asked to provide this explicit confirmation in advance of training being commenced.
13. Further information that should be requested from course providers includes a detailed syllabus and timetable, and the credentials and qualifications of those delivering the training. Completion of training must be formally certified by the educational institution in question, and it must be clear what external quality assurance / validation has been achieved.

On completion of training

14. The Dental Council published [updated guidance on Continuing Professional Development](#) (CPD) in 2019. On completion of undergraduate training, dental professionals are ethically obliged to then maintain their competence on an ongoing basis, reflecting the distinction between the acquisition and maintenance of competence. The Dental Council has stipulated that a minimum of 5 hours of structured CPD activity per five-year cycle is necessary for radiology informatics and radiation protection.
15. Records of completed training must be maintained and made available on request during any process intended to establish and maintain a radiation safety remit for clinical sites and dental practices. The Dental Council's CPD requirements confirm that records of all completed CPD activity should be kept including both structured and self-directed activities.
16. Dental professionals must be registered with the Dental Council in order to perform delegated duties under the BSSD.
17. Dental professionals are reminded that they must only work within their personal competence. The training undertaken by dental professionals must be appropriate to the envisaged duties of the individual in question. Training requirements may change or need to be updated to take account of individual or practice circumstances, acquisition of new equipment etc.

Delegated duties - additional information for Auxiliary Dental Workers

18. The Dental Council does not have an explicit role to directly approve courses in radiation safety and practice. It is anticipated that the information provided above will enable dental professionals to make informed decisions when considering courses of study.
19. The Dental Council confirms that the [Certificate in Dental Radiography delivered by the Dublin Dental University Hospital](#) (DDUH) and the [Certificate in Dental Radiography delivered by the Cork University Dental School and Hospital](#) (CUDSH) each meet the expectations of the Dental Council as expressed in this document. These courses have been designed for dental nurses and for dental hygienists. The shared syllabus and learning outcomes underpinning each of these certificate courses are appended to this document as Appendices A and B respectively.
20. With direct reference to the two certificate courses delivered in Ireland, appendices A, B, C are presented as an indicative course syllabus, a set of course learning outcomes, and graduate professional skills & competences. In addition, the following key and shared characteristics are

intended to assist dental professionals with their appraisal and selection of potential training courses: -

- a) Both courses are provided by approved dental schools operating within university structures. The underlying quality of the qualification is therefore benefitting from university quality assurance and approval mechanisms.
- b) Both courses are approved by the Dental Council and represent the standard for dental radiography training in Ireland. In this sense, the courses have a particular national standing and are benchmarked to dental practice requirements in Ireland.
- c) Both courses share an almost identical syllabus, set of knowledge outcomes and expected competences (see appendices A, B and C).
- d) Both courses employ a range of instructional methods. Theoretical components are delivered both in-house and using online methods. Basic radiographic techniques are delivered in-house and subsequently supervised by the student's employer in practice. The role of external practices and of the employing dental practitioners is significant. There are strict requirements in place to underpin these external contributions.
- e) Both courses incorporate a range of assessment methods including an end of course examination.
- f) Both courses require students to maintain a logbook/portfolio of experience which will be reviewed by a senior radiographer. A minimum number of views should be taken, as follows:-

25 Intra Oral - minimum 10 sets of bitewings, periapical and occlusal.
25 Extra Oral - OPG / lateral ceph (minimum 5 ceph)
10 Any view - Intra Oral / Extra Oral
- g) The duration of training is a minimum of 5-6 months.

CBCT Training

21. The training courses referenced above do not prepare auxiliary dental workers to undertake delegated duties involving Cone Beam CT. In order to undertake duties involving Cone Beam CT, specific additional training is necessary as per the requirements of the European Guidance [*Cone Beam CT for dental and maxillofacial radiology \(evidence-based guidelines\) \(Radiation Protection No. 172\)*](#).
22. In addition to the earlier guidance provided in relation to the selection of training courses, dental professionals, according to their roles and responsibilities, should seek confirmation from training providers that the training recommendations contained in the 2014 position paper [*Basic training requirements for the use of dental CBCT by dentists: a position paper prepared by the European Academy of DentoMaxilloFacial Radiology*](#) will be met. This EADMFR paper builds upon the requirements established by [*Cone Beam CT for dental and maxillofacial radiology \(evidence-based guidelines\) \(Radiation Protection No. 172\)*](#) and should be viewed as authoritative.
23. It is acknowledged that manufacturers of CBCT equipment work closely with dental practices as part of the installation and commissioning of equipment, and will provide initial training as part of this activity. While this initial training will address some of the practical aspects of CBCT equipment

and will be applicable to dentists and members of the dental team holding delegated duties, it alone will not be sufficient to develop competence in the use of CBCT equipment. Further training that meets that meets the recommendations of the aforementioned EADMFR paper must be completed.

24. Having completed sufficient initial training, those involved with dental CBCT should complete CPD in radiology and radiation protection specific to dental CBCT.

Training delivered outside of EU

25. It is unlikely that courses delivered outside of the EU will make direct, if any, reference to EU legislation. Dental professionals who have completed radiography training outside of the EU will need to be able to demonstrate that their training is sufficient in order to undertake radiographic duties in Ireland, and the information provided throughout this document is intended to assist with such an exercise. The evidence of such training, and the establishment of compatibility with minimum EU standards, will need to be considered by employers and practice leads and may also need to be made available to an inspecting body.

Dental Council
February 2023

**Appendix A – Shared Syllabus for the DDUH and CUDSH Certificates in
Dental Radiology for Dental Nurses/Dental Hygienists**

Basic and Radiation Physics

- Concepts of Radiation
- Atomic Structure
- X-ray Production
- Interaction with Tissue
- Bioeffects of Radiation

X-ray equipment

- General x-ray tubes
- Dental x-ray tubes
- Specialised X-ray tubes

Exposure Factors

- Basic and Advanced Concepts
- Image Quality Criteria

Radiographic Technique

- Indications and Considerations
- Principles of Dental Technique
 - Paralleling / Bisected Angle
 - Bitewing
 - Occlusal
 - OPG
 - Ceph

Image Receptors

- Image Production and Film
- Screens and Cassettes
- Digital image Production
 - Receptors
 - Acquisition and imaging chain
 - Post-processing and hardcopy

Processing

- Film Processing: Principles and Practice
- Chemical Hazards Film Faults

Digital

- Display
- Processing
- QA
- Legislation pertaining to dental practice

Quality Assurance

- Equipment
- Photographic

Radiographic Technique

- Radiographic Anatomy
- Radiographic Image Appraisal / Critique

**Appendix B - Shared Learning Outcomes for the DDUH and CUDSH Certificates in
Dental Radiology for Dental Nurses/Dental Hygienists**

Participants must be able to:

- Describe the basic principles of X-ray production.
- List the precautions necessary to minimise ionising radiation dose and describe the bioeffects of ionising radiation.
- Describe the X-ray equipment commonly used in dental radiography to provide a basis for imaging and digital imaging.
- Describe and explain the relationships between exposure factors and image quality.
- Examine safe work practice guidelines in relation to the maintenance of equipment used in oral and dental radiography.
- Demonstrate awareness of methods of maintaining and monitoring X-ray equipment and undertake these under supervision.
- Describe the legislation and guidelines governing safe work practices and apply these in dental radiography.
- Describe and evaluate intra and extra oral dental radiography techniques.
- Evaluate the role and responsibilities of the radiographer and the associated evidence-base for accurate, safe and legal practise and the correct infection prevention and control procedures.
- Evaluate the appropriateness and benefits of radiographic examinations relative to the patient presentation and diagnostic inquiry.
- Describe the photographic and processing materials commonly used in dental radiography in terms of achieving optimum image quality.
- Describe the post-processing, storage, and retrieval of digital radiographs.
- Critically appraise dental radiography images in the context of image quality criteria and normal versus commonly seen abnormal pathology.

Appendix C - Professional skills / competences for Dental Nurses/Dental Hygienists

Participants must be able to:

- Understand X-ray production.
- Minimise ionising radiation dose to patients and staff.
- Understand the X-ray, processing and digital equipment commonly used in dental radiography.
- Understand and manipulate the exposure factors for low radiation dose and high image quality.
- Position patients correctly and select an appropriate film holder as required for the production of intra-oral radiographs.
- Demonstrate practical skills in taking periapical, bitewing, occlusal, cephalometric and panoramic radiographs.
- Demonstrate competence to process, mount, file and record oral and dental radiographs.
- Apply appropriate radiation protection measures for patients and staff.
- Process x-ray film and identify associated problems and to post-process, store, and retrieve digital radiographs.