

IRMER 18

The Guidelines

What they mean to you in practice

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The Ionising Radiation [Medical Exposure] Regulations 2018 IR(ME)R govern the use of ionising radiation, including x-rays, in healthcare.

- The purpose of IR(ME)R is to minimise the risk to patients undergoing medical exposures.

A requirement of IR(ME)R is that the Employer puts in place written Employer's Procedures [EP] for Referrers, Practitioners and Operators to ensure that radiation is used safely and appropriately

- These regulations are concerned with the **safety of patients**
- They replace the Ionising Radiation (Protection of Persons Undergoing Medical Examination or Treatment) Regulations

IRMER2000

Designation of controlled or supervised areas

Every employer must designate as a controlled area any area under its control... in which it is necessary for any person who enters or works in the area to follow special procedures designed to restrict significant exposure to ionising radiation in that area

- All dental x-ray equipment requires a controlled area
- RPA advises on the extent of the controlled area

These will not be consistent, they are dependent upon equipment, room size, room layout, room construction

Controlled Area Designation

The regulator in Scotland has retained a dental practices' right to choose an appropriate design for its controlled area from the templates provided in the "Guidance Notes for the Safe use of X-ray Equipment for General Dental Practitioners(2nd Edition).

This choice should be made in collaboration with the advice of your RPA as part of the "risk assessment" process.

Development of digital technology has greatly enhanced our ability to acquire high quality images with greater diagnostic yield while potentially lowering radiation exposure.

The quality of X-ray images has improved dramatically over the years and is dependent particularly on

- correct selection and excellent technique
- use and maintenance of X-ray equipment

Who is Affected by IRMER?

- Patients
- Individuals as part of health screening
- Research
- Carers and comforters
- Asymptomatic individuals
- Non imaging procedures

Dentists

- Dentists can carry out all roles in radiography and radiology.
- Additional training will always be needed for new tasks for which there is inadequate or no previous training
- e.g. the introduction of dental cone beam CT

Dental hygienists and dental therapists in Scotland

- It should be noted that the scope of practice of dental hygienists and dental therapists was extended in 2013 to encompass the "prescription" of radiographs (i.e., the referrer and IRMER practitioner roles as defined under IRMER18

- The employer should ensure that the skills and abilities of these groups of dental professionals are adequate and kept up-to date for all the roles they perform, irrespective of their dates of qualification.

Dental hygienists and dental therapists are able to take on the roles of "referrer", "practitioner" and "operator" under IR(ME)R

- Should have documented evidence to demonstrate they are trained, competent and indemnified.
- You should contact the GDC to find out what documented evidence they would require to satisfy the need of these requirements
- Dentists remain the only member of the dental team who can report on all aspects of a radiograph.

Independent DCP practices would need appropriate referral arrangements in place to ensure patients receive advice and subsequent treatment.

Dental nurses

- Dental nurses should have the skills and abilities to perform certain operator roles as part of their training, such as assisting a dentist in preparing to take a radiograph, pressing the exposure button under supervision, processing a film radiograph or a CR plate.
- Dental nurses do not refer patients for X-ray examinations, take responsibility for an X-ray examination (i.e. act as IRMER practitioner) or clinically evaluate radiographs.

The Positions Of Responsibility: Ir(Me)R Duty Holders

- The Employer (Legal Person)
- The Referrer
- The Practitioner....IRMER
- The Operator
- The Medical Physics Expert

The Referrer

is responsible for supplying the IR(ME)R practitioner with sufficient information to justify an appropriate exposure

DENTIST

- Must have been a history and clinical examination previous to the referral
- Previous radiographs should accompany the patient if relevant
- Diagnostic information entered in writing
- WHAT do they want.... e.g. upper left 6
- Why do they want..... query infection
- How do they want it done..... periapical

Where the referrer and IRMER practitioner are not the same person e.g. a patient is referred to another practice or hospital, or to another IRMER practitioner at the same practice, the referrer must supply the required information in writing, paper or electronic forms are acceptable). It is recommended that this includes:

Any previous relevant radiographs (where possible) and at least the following:

- Unique identification of the patient
- Clinical information (including any previous medical imaging) to enable the IRMER practitioner to decide if the requested exposure can be justified
- Unique identification of the referrer
- Date of referral

The IR(ME)R Practitioner

- The IR(ME)R Practitioner takes responsibility for a medical exposure .
- The IR(ME)R practitioner must be adequately trained to take decisions and the responsibility for the justification of every exposure
- Dentists, as well as hygienists and therapists who qualified after 2013, and who are registered with the GDC are all adequately

trained to justify intra oral, panoramic and cephalometric radiographs

- Dentists are likely to require additional training to enable them to justify dental CBCT imaging, and hygienists and therapists should not normally be expected to justify cephalometric radiography or dental CBCT imaging

Justifying an Exposure

Justification should be carried out prior to the exposure.

When justifying an exposure, the Practitioner must consider the following:

- The clinical justification for the exposure
- The risks posed by exposure to radiation
- The risk versus benefit of the equipment selected, for example the higher dose of Cone Beam CT (CBCT) or panoramic imaging is not justified when an x-ray would provide adequate diagnostic information, and
- Whether an alternative option, which does not use radiation, would deliver the same diagnostic information.

The Process

Before an exposure can take place the IRMER practitioner must decide whether the:

- Benefit to the patient from the diagnostic information obtained will outweigh the detriment arising from the exposure.
- The exposure would normally be expected to provide information to aid or change the patient's management or prognosis in order to be justified.

IRMER practitioner must give appropriate weight to:

- The availability and findings of previous radiographs (or dental CBCT images)

- The specific objectives of the exposure in relation to the history and examination of the patient
- The age of the individual bearing in mind the increased radiosensitivity of children compared to adults

If the information provided by the referrer is incomplete or inadequate, the IRMER practitioner should not justify and authorise the exposure until the full information has been provided.

- There can be no possible justification for the routine radiography of 'new' patients without a thorough clinical examination.
- A history and clinical examination are the only acceptable means for determining if dental disease is suspected, and to help decide which are the most appropriate, and necessary, radiographic views.

Justification is an Intellectual Process and Authorisation is proof that justification has taken place

- If the IRMER practitioner were to reject an exposure request, then the reasoning should be recorded and the referrer informed.

Special attention is needed for the justification of dental CBCT examinations where patients are referred from one practice to another:

- To ensure that the referral is appropriate and consistent with evidence-based referral guidelines
- To ensure that the clinical evaluation will be conducted by an appropriately trained person

Recording the justification

If one person is acting as entitled Referrer, IR(ME)R Practitioner and Operator, the Referrer's [*signature/ electronic personal code/personal login*] in the clinical notes next to the request for a radiograph will demonstrate authorisation of the exposure.

The Authorisation Process

The IRMER practitioner should then make a written record of the justification decision, known as 'authorisation'.

The employer should establish the method of authorisation.

- A signature in the patient's clinical notes
or an electronic signature
- Authorisation should be carried out in advance of any dental exposure.

In exceptional circumstances, it may not be feasible for a dentist to carry out authorisation in advance of an exposure.

- This may occur during treatments where it is not in the best interests of the patient for the dentist to leave them to document the authorisation
- e.g. an unplanned radiograph due to a complication mid-procedure.
- The Dentist justifying the exposure should stay in the room whilst the radiograph is carried out and authorisation must occur as soon as possible within the same episode of care.
- This deviation from normal procedure should be documented within the patient's dental record by the dentist.
- At all other times authorisation must be carried out in advance taking the image

The Operator

- Dentists,
- DCPs,
- Hygiene Therapists

The person conducting any practical aspect of a medical exposure

Practical aspects include:

- patient identification
- positioning film, patient or x-ray tubehead
- Setting of exposure options
- Pressing the exposure switch to initiate the exposure
- Processing films

- Clinical evaluation of exposures
- Exposing test objects as part of QA programme
- The operator must be adequately trained for their role in the exposure

<u>DIAGNOSTICALLY ACCEPTABLE</u> A	<u>DIGITAL</u>	<u>FILM</u>
No errors or minimal errors in either patient preparation, exposure, positioning, image (receptor) processing or image reconstruction and of sufficient image quality to answer the clinical question	Not less than 95%	Not less than 90%
<u>DIAGNOSTICALLY NOT ACCEPTABLE</u> N		
Errors either patient preparation, exposure, positioning, image (receptor) processing or image reconstruction which render the image diagnostically unacceptable	Not greater than 5%	Not greater than 10%

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Medical physics expert (MPE) not RPA

- IRMER18 requires employers to ensure that a suitable MPE is appointed and involved, as appropriate, for every type of exposure subject to the regulations.
- A list of registered MPEs can be found on the RPA2000 website
- Qualifications: Science degree or equivalent
- Experience in the application of physics, within dental use of ionising radiation
- Must be appointed to this role
- IR(ME)R18 requires that the MPE must be “appointed” by the employer and must meet criteria of competence
- In practice, the role of the RPA, already required under IRR18, is generally combined with the MPE role

MPE gives advice on:

- Dosimetry and QA in relation to exposures
- Measurement methods for the evaluation of the dose delivered to patients

- Dental X-ray equipment and ancillary equipment (e.g., digital image receptors, phosphor plate or film processors, computer screens used for interpreting radiographs etc.)

Contributing to:

- Preparation of technical specifications for equipment and installation design
- Acceptance testing of dental X-ray equipment
- The definition and performance of QA programmes for dental X-ray and ancillary equipment •
- Optimisation of doses to patients and others (such as carers and comforters)

Application and use of diagnostic reference levels

- • Analysis of events involving suspected or actual **accidental or unintended exposures**
- • Selection of equipment to perform radiation protection measurements
- • Training of IRMER practitioners and other staff in radiation protection
- • Advising the employer regarding compliance with IRMER18

Optimisation

- ALL EXPOSURES shall be kept as low as reasonably practicable ALARP taking economic and social factors into account
- Lower the age-Higher the risk
- Justification more important for children
- Dose limitation:

Technique

Quality Assurance

Selection Criteria

Use of guideline exposure settings

OPTIMISATION RADIATION RISKS	
AGE IN YEARS	MULTIPLICATION FACTOR PER RISK OF CANCER
UNDER 10	x3
10-20	x2
20-30	x1.5
30-50	x0.5
50-80	x0.3
OVER 80	NEGLIGIBLE

The operator shall select equipment and methods to ensure that for each medical exposure the dose of ionising radiation to the individual undergoing the exposure is as low as reasonably practicable.

- Written protocols in place for type of standard exposure for each x-ray set
- Adherence to diagnostic reference levels
- QA procedures
- Practical aspects
- Tube operating parameters -exposure charts
- Rectangular collimation-areas protected
- Film speed – F
- Digital – Phosphor plates exposure range. Direct digital
- X-ray holders

Optimisation

Diagnostic Reference Levels for radio diagnostic examinations

- A radiation dose for a typical examination for a standard sized patient
 - Aid to optimisation
 - Local, National or European DRLs
 - Should not be exceeded without good reason
 - Do we know? Advice from MPE

Limitation

The **dose equivalent** to individuals shall not exceed the limits recommended by the ICRP

INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

IRMER18 duty-holders in dental CBCT imaging

A practice with a dental CBCT unit may have several dentists in the practice making use of this one unit with a limited number of staff

- trained,
- competent and
- entitled to operate the equipment.
- Possibly referrals will be accepted from other dental practices to make full use of the resource. More detailed and robust systems need to be in place to ensure that the equipment is used correctly, without incident and in line with IRMER18

Special attention is also needed for the justification of dental CBCT examinations where patients are referred from one practice to another

- ensuring the referral is appropriate
- consistent with evidence-based referral guidelines
- ensuring the clinical evaluation will be conducted by an appropriately trained person

Employer's Procedures

- For all types of dental exposures, there must be documented compliance and a quality assurance system to ensure the safe and efficient use of the dental X-ray equipment. Including the employer's written procedures as specified in IRMER18
- Issue these procedures to all persons who are required to work in accordance with them
- Keep a record of who they have been issued to, the date of issue, and that they have been signed to say they have been read

Identification of the individuals entitled to act as referrer, IRMER practitioner or Operators

- The employer must also ensure that all those entitled as the:
- Referrer,
- IRMER practitioner or
- Operator are suitably trained and competent for their role and range of duties
- A template should be drafted in consultation with the MPE

Patient Identification

- New emphasis to reduce errors.
- Dental radiography usually takes place immediately after the clinical examination thus the operator can be confident that the correct patient is receiving the correct radiographic examination
- Patient identification now focusses on “do you have the correct patient record open in your patient management system rather than the correct patient in your chair.
- Most patients are familiar faces, the more likely accident is that the wrong patient note is on the monitor as its never the wrong patient in the chair!

If the operator carrying out the exposure is not the same person as the referrer, and the exposure is carried out at a different time to the clinical assessment, the patient should be positively identified prior to the exposure taking place.

3 identifiers

- What is your name?
- What is your address?
- What is your date of birth?”

For follow up patients

- The patient’s dental chart would also be available, which can be compared to a visual examination of the patient’s teeth. This can act as an additional check to ensure that the person being

examined is the correct patient, and that the correct patient's notes are open on the computer.

Where patients are referred from another dental practice

Three additional questions should be asked to verify the patient's identity, such as:

- “What area or tooth is this X-ray for?”
- “Who sent you for this X-ray?”
- “Why are you having this X-ray

The deaf patient..

These questions can be asked using written cards.

- If the patient through illness, physical or mental disability, or language barrier is not able to confirm their identity:
- Record how identification was achieved:
- A carer or relative may be asked to identify the patient
- Examine photographic identification they may have such as a passport or photocard driving license
- For patients with language difficulties identification through an interpreter or relative may be possible if one is available

Pregnancy Enquiries

X-Ray Exposures

In line with the Faculty of General Dental Practice UK (FGDP) guidance, patients do not need to be asked if they are pregnant before an exposure.

- Dental x-ray imaging is, by general professional consensus, not damaging to a developing foetus except for vertex occlusal
- No formal pregnancy enquiries are required under IR(ME)R . Therefore a procedure could just state that these enquires are not made
- A patient may be asked about their pregnancy status for psychological reasons

If a pregnant patient is concerned about the potential for the radiograph to damage their unborn child, and is not reassured by

- The dentist,
- RPS or
- Medical physics expert
- The dentist may consider delaying the radiograph if it is in the best interests of the patient's health and wellbeing. This decision should be documented in the patient's dental record.

Scotland v the uk

You must have the risk benefit displayed appropriately in Scotland which allows you to avoid difficult discussions with patients about equivalent radiation doses.



- Information relating to the benefits and risks of an exposure will be provided to all patients
- A risk and benefit poster advising pregnant patients to inform the dentist before any type of dental treatment or procedure will be clearly displayed in the practice waiting room or treatment area. This should be of a size and height that it is visible to all patients, whether pregnant or not
- These Scottish posters can be used all over Britain
- Different devolved administrations can remove the NHS Scotland logo and add their own.
- Practices can personalise the poster by adding their practice logo

The “risk benefit poster” is an accommodation by the regulator in Scotland whereby a practitioner may legitimately bypass the

regulation around prior notification of the amount of radiation a patient will receive from a radiograph prior to an exposure. As long as this poster is displayed and is legible for patients from a seated position in the waiting area or surgery.

- The text must all be readable and as such **an A4 poster size will not** suffice. The size of the poster is proportionate to the distance from the patient to the wall the poster is on a size guide is displayed to allow an adequate sized poster to be ordered.
- Posters must be laminated to allow them to be wiped for decontamination purposes.

Provision of Information Relating to the Benefits and Risks of an Exposure

- It is essential that, wherever practicable, and prior to an exposure taking place, the individual to be exposed or their representative is provided with adequate information relating to the benefits and risks associated with the radiation dose from the exposure.

Risk Benefit Analysis

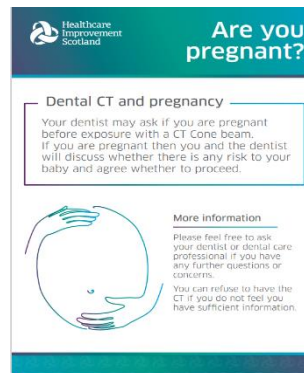
- The regulator was concerned that the information being presented to patients around what constituted a radiation equivalent value to that of an image was variable from dental practitioner to dental practitioner.
- This inconsistent and would also perhaps prevent risk averse patients from having what were essential radiographs.
- The dentist acting as the radiographic “practitioner”(duty holder) is obliged to “justify” the requirement for an image and is perhaps better placed to make an informed decision on relative risk benefit analysis.

This poster is of optimum importance and should be clearly seen and easy to read for all patients

- A3 size is mandatory only with this poster.
- Displayed in the surgery ...LAMINATE

Patient Consent

- Legislation is the same across Britain but
- In Scotland discussion with patients in relation to exposures is not necessary, the Benefit Risk poster is sufficient
- In England an outline of exposures is necessary



Assessment of patient doses

- Measurement of dose
- The Medical Physics Expert (MPE) will ensure that representative measurements of patient dose are made as part of the x-ray Quality Assurance (QA) programme and will recommend appropriate exposure settings based on these measurements.

Recording of dose

- The total number of exposures must be recorded in the patient's notes. This will include the reason for carrying out any repeat exposures.
- The Operator should record that the standard settings (as recorded in the exposure protocols) for the exposure used.

If there was any deviation

- The total number of exposures must be recorded in the patient's notes. This will include the reason for carrying out any repeat exposures.
- deviation from the standard exposure, the Operator must record details of the deviation

- kV, mA
- Exposure time [ms]
- Dose Area Product [DAP] value
- Dose Width Product [DWP] value
- Other dose indicator e.g. exposure or sensitivity index for digital images

Equipment installed on or after 6 Feb 2018 will have a device or other feature that provides information on the relevant parameters to allow assessment of the patient dose. If available, this value should be recorded in the patient's notes.

Exceeding Expected Dose

- The Operator undertaking the exposure will be aware of the range of doses or Diagnostic Reference Level (DRL) that result from the exposure factors set within the protocols.
- They should identify any exposure which has exceeded the expected dose and understand when this is notifiable.
- When a DRL is consistently exceeded, the MPE must be involved in the review.

Dose Monitoring

- The employer will implement a programme for carrying out patient dose surveys in consultation with the Medical Physics Expert

Diagnostic Reference Levels

- 2005 survey showed the dose for the same intraoral dental radiograph varied by a factor of 600 between lowest and highest doses
- Diagnostic Reference Levels provide audit standard
- Legally you must compare audited patient dose with locally set Diagnostic Reference Levels
- For General Dental Practice its recommended that these National Diagnostic Reference Levels are adopted as local..... unless local measurements of patient doses support adoption of lower values

National Diagnostic Reference Levels are published by PHE based on national patient dose surveys and are updated every few years.

- These include National Diagnostic Reference Levels for
- Intra oral
- Panoramic
- Cephalometric
- Dental CBCT examinations for both adult and child patients

Local Diagnostic Reference Levels should be set at a level which represents the upper boundary of patient doses that can be considered to be optimised, taking into account:

- X-ray sets
- Imaging equipment in use at the practice,
- Should not normally be exceeded without good reason.

Patient doses should be reviewed regularly against the local Diagnostic Reference Levels (MPE)

- whenever significant changes may affect patient doses eg:
- Installation of new or modified X-ray equipment
- Changes in the types of image receptors and image processing facilities

The Diagnostic Reference Levels prepared by the Medical Physics Expert, will be reviewed every 3 years

Current DRLs should be documented on:

- Exposure charts and
- Radiation Protection File

Once set, these DRLs are not expected to be exceeded when good and normal practice and high quality technique is applied

The operator undertaking the exposure, when possible, must ensure that after each exposure any dose information is considered in relation to the Diagnostic Reference Levels dose information available

- If following each exposure, the dental x-ray machine provides a Dose Area Product value or some other dose indicator this should be reviewed by the operator with regard to the appropriate Diagnostic Reference Levels . This dose value **must** be recorded in the patient's dental record or electronic record.

If Diagnostic Reference Levels are exceeded, record with extenuating circumstances in a designated book or electronic record.

DRLs consistently exceeded ? Reasons must be investigated immediately.

The operator must inform:

- MPE
- The employer
- Line Manager

No dose value available?

- If the dental x-ray machine does not provide a DAP value or other dose indicator, it is not possible to consider the dose with regard to the DRL.
- However there are some reassurances that the intended dose has been given depending on the image acquisition method.

Reviewing Diagnostic Reference Levels that are consistently exceeded

- The MPE, RPS or operator must inform the employer as soon as they are aware that the DRL is being consistently exceeded.
- The reasons must be investigated immediately by the employer/named person/MPE so that corrective action may be taken.
- Any corrective action should be documented and communicated to relevant staff.
- DRLs can be set locally to reflect local practice (LDRLs)
- Can be set following a dose survey by the MPE
- They are based on group of patients, so cannot be compared directly to an individual, however they can be used as a 'signpost '

Computed Radiography (CR) and Digital Radiography (DR)

- The resultant image includes a Sensitivity/Exposure Index or graph. This will be compared to the manufacturers recommendations. If the value/graph is unexpectedly outside the recommended range then the RPS/lead dentist will be informed and further tests may be made.

Film

- The amount of radiation reaching the film may be assessed by evaluating the image quality. If the chemistry is known to be correct and the film is too dark, then it may be that too much radiation is being emitted and therefore the DRL may be exceeded. The RPS/lead dentist will be informed and further tests may be made if necessary.

The process for recording factors relevant to dose :

- Adhere to the standard settings unless optimisation is possible or necessary.
- Record the exposures given
- The total number of exposures
- Any repeats? Document why!
- Exceeding DRLs.....document why!
- When available, the operator must also record the dose value. The dose value will be shown on a display of milligrays on a control panel...ensure this is documented in patient records
- The operator undertaking the exposure will be aware of the range of doses or Diagnostic Reference Levels that result from the exposure factors set within the protocols.

Exposure of Carers and Comforters

ALARP

- Those who are knowingly and willingly exposed to ionising radiation whilst supporting an individual undergoing an exposure.
- Dose constraints and guidance for carers and comforters who support patients during exposures must be established in consultation with the MPE

- Those who are knowingly and willingly exposed to ionising radiation whilst supporting an individual undergoing an exposure.
- Dose constraints and guidance for carers and comforters who support patients during exposures must be established in consultation with the MPE
- Where a carer or comforter remains in the room with the patient during dental radiography, a dose constraint must be applied to the carer or comforter's exposure based on the advice of the MPE.
- The IRMER Practitioner must authorise the exposure and document in the patient record that a carer or comforter has been involved in the exposure.

Carers and Comforters (HOLDING)

- Should be like the first image, gentle and supportive but it can be the more like the second image a wrestling match.

Emphasis change

- the default position now is that dental practitioners should consider who is best placed to provide the necessary care for a child and consult with that team prior to any "holding" as in most circumstances the PDS or hospital service will have a better chance of an appropriate useful image.
- Carers and comforters should only provide support where the patient is unable to keep the image receptor still, or where the patient requires reassurance during a radiograph.
- Where any consideration is given to the usage of a carer or comforter to support a patient the default position should be to give due consideration as to where best this patient's care is to be delivered. If onward referral is required, dialogue should precede any images being taken
- Consult with the team you are to refer to, as they may be better placed to generate images.
- The best patient outcomes should underpin these discussions.
- Carers and comforters must have the risks and benefits of being present during the exposure to radiation fully explained to them before the exposure is taken.

If a carer or comforter has to remain in the controlled area during an X-ray exposure they must

- Stand as far away as possible from the X-ray tube head
- Out of the path of the main X-ray beam and
- Not hold or support the X-ray tubehead
- Collimator or
- Image receptor with their hand
- The operator must record the dental X-ray exposure factors (to enable an estimate of the dose)

Training and Education

- The Employer is responsible for ensuring that Practitioners and Operators are adequately trained for their scope of practice.

Including :

- training on each specific piece of equipment to be used
- radiation safety and IR(ME)R.

The Employer ensures training is delivered by

- Designated competent trainers and
- Duty holders have an up-to-date training record

Including their current registration details and available to relevant enforcing authorities

Employers must have:

- evidence of the training
- competence of any staff working under practicing privileges, and that they are entitled to work in the practice/independent clinic such as associates, locums and visiting independent clinicians.

Students and Trainees

Direct supervision by someone who is:

- adequately trained
- entitled
- directly accountable for the activity of the trainee.

Research Exposures

- If you **DO NOT** conduct research, the Employer Procedures can simply state:
- No research exposures are currently undertaken at this practice

The Employer's Responsibility

- The Employer must ensure that all research has received approval from an ethics committee and that every request is authorised, and a clinical evaluation performed.

The Research Practitioner

- A protocol for each research project will be written by the research Practitioner and made available to all documented operators
- The Practitioner must also determine that there is sufficient net benefit to allow research exposures to go ahead.

Referrals

- The Referrer must indicate in the patient's record that the request is for a research exposure.

The Medical Physics Expert

- The MPE will be involved with the dose and risk assessment, as agreed within their contract, and will identify a dose constraint, when no direct medical benefit is expected to the individual from the exposure.

The Operator

- Operators must follow the research protocol developed for the research study ensuring the dose constraint set by the MPE is **adhered to**.

Non Medical Imaging

Non Medical imaging may include

- Dental radiographs for employment purposes, such as for military personnel/flight crew or deep-sea divers
- Radiological imaging for insurance or legal purposes
- Radiological age assessment

- Identification of drugs or other evidence that may be concealed within a dental cavity.

If you **DO NOT** conduct non-medical imaging – the Employers procedures can simply state:

- Non-medical imaging will not be undertaken unless identified in this EP.

Age Assessment

- Another example is the use of dental radiographs for age assessment for population groups such as refugees and asylum seekers. This practice goes against FGDP(UK)'s radiography guidelines and has been condemned as unethical by the British Dental Association and Royal Colleges in the UK.
- In Scotland there are no radiographic age assessments done

Possibly in other areas of Britain this may not be the case

Many dentists may not be indemnified for this procedure which may nonetheless still be happening in the UK at the request of public authorities. The new regulations will require that employers have a procedure in place for non-medical exposures

Incident reporting

- Accidental/Unintended Exposures

Identifier will document within 1 day:

- All available data
- Inform MPE

The patient will be informed unless extenuation circumstances indicate not informing and this would be in the best interests of the patient.

This is a Practitioner responsibility and is documented

The MPE is responsible for assessing the patient's dose and for advising the Employer whether an incident needs to be reported to Healthcare Improvement Scotland or if any other steps need to be taken.

Recording of Accidental/Unintended Exposures

The Operator will record on an incident form and provide the following information to the Employer/MPE:

- Patient demographics
- Exposure and possibly error codes and unusual signals
- What happened and why
- Other relevant information

Learning from incidents

- Lessons arising or changes to practice following the investigation will be implemented to ensure future risks are minimised.
- Relevant staff will be informed of all incidents and any lessons arising from the investigation and any changes to practice.

Recording of exposures

In hospital practice all exposures are currently recorded, this is probably not the case in general dental practice

Gold Standard - Record Your Exposures!!

Reducing the probability and magnitude of an unintentional exposure

DIAGNOSTICALLY ACCEPTABLE A	DIGITAL	FILM
No errors or minimal errors in either patient preparation, exposure, positioning, image (receptor) processing or image reconstruction and of sufficient image quality to answer the clinical question	Not less than 95%	Not less than 90%
DIAGNOSTICALLY NOT ACCEPTABLE N Errors either patient preparation, exposure, positioning, image (receptor) processing or image reconstruction which render the image diagnostically unacceptable	Not greater than 5%	Not greater than 10%

Audit

- Regular audit will be carried out at intervals set by the Employer.
- Audits of compliance with IR(ME)R will include topics such as the
- recording of dose,
- Operator training records.
- Clinical audits will also be conducted.

- These will include reviewing and improving healthcare outcome
- Ensuring patient care is provided in line with best practice standards.

Equipment

- Regular quality assurance is conducted of all equipment to ensure correct functioning.
- The Employer is responsible for ensuring that an equipment inventory is kept for all radiation equipment
- All equipment is maintained in accordance with manufacturer's instructions.

Training

- Training and competence assessments will be undertaken for all Operators, including when new equipment and procedures are introduced.

Incidents

- Learning should be shared with all relevant staff, along with any changes implemented following incidents and near misses.
- Employers procedures and protocols will be regularly reviewed to ensure they match local practice
- All equipment will regularly undergo quality assurance to ensure it is functioning correctly
- 10% of images are deemed unacceptable - extra tests
- Staff feedback given following incidents

Training and competence assessments will be ongoing.

- Always when new equipment and procedures are introduced
- An equipment inventory is kept on all radiation equipment and is maintained in accordance with manufacturer's instructions
- All duty holders shall comply with the employer's procedures.
- Practitioners and operators ensure that the doses are kept as low as reasonably practicable consistent with the intended purpose.
- Induction programmes for new staff

- Grading and review of dental images
- Clinical audit
- Audit of procedures
- Good practice and technique applied
- Investigation of near miss incidents
- Peer review of images – looking at image quality to include positioning, collimation, density, sharpness and exposure

Document QA

AUDIT

- To ensure that clinical audit is undertaken
- To ensure that the content of the written procedures are audited to ensure compliance by the duty holders
- The employer will ensure that *annual* audit is undertaken with a consistent approach and that the outcome of all audits will be fed back to relevant staff.

Equipment

Critical testing

Manufacturers responsibility

Acceptance Test (IRMER 18)

THE USERS RESPONSIBILITY

- Equipment must be critically examined (manufacturers) and acceptance tested before being put into clinical use and then routinely tested as part of quality assurance program.
- The acceptance test in addition to the features covered in the critical examination should include:
- Measurements to determine whether the equipment is operating within agreed performance parameters e.g. kV, mA and timer accuracy
- An assessment of typical patient dose for comparison with National diagnostic reference levels

- Record of film, film / screen combinations and processing details and an evaluation of the adequacy of processing .

Intra Oral Radiography

- Tube voltage should not be lower than 50 kV
- New equipment should operate within 60–70 kV
- All equipment should operate within 10% of the stated or selected kV setting
- Beam diameter should not exceed 60 mm at the patient end of the spacer cone
- Rectangular collimation should be provided in new equipment and fitted to existing equipment at the earliest opportunity and the beam size should not exceed 40 x 50 mm
- Total beam filtration should be 1.5 mm of aluminium for sets operating below 70 kV and 2.5 mm of aluminium for sets operating above 70 kV and should be marked on the tube housing
- The focal spot position should be marked on the outer casing of the tube head
- Focal spot to skin distance(FSD) should be at 20cm
- Film speed controls and finally an adjustable exposure time settings should be provided
- The fastest film available i.e. E – F speed that will produce satisfactory diagnostic images should be used

Panoramic Radiography

- Equipment should have a range of tube potential settings preferably from 60 to 90 kV
- The beam height at the receiving slit of the cassette holder should not be greater than the film in use normally 125 mm or 150 mm in width of the beam should not be greater than 5 mm
- Equipment should be provided with adequate patient positioning aids incorporating light beam markers
- New equipment should provide facilities for field limitation techniques.

All equipment

- Should have a light on the control panel to show that the mains supply is switched on
- Should be fitted with a light that gives a clear and visible indication to the operator that an exposure is taking place and audible warnings should also provide the operator with the same information
- Exposure switches ie timers should only function while continuous pressure is maintained on the switch and terminate if pressure is released
- Exposure switches should be positioned so that the operator can remain outside the controlled area and at least 2 metres from the x-ray tube and patient
- Exposure times should be terminated automatically

Routine Testing

Similar content to an Acceptance test

Emphasis on:

- Confirmation that no significant changes have been made in relation to equipment ,its location and its acceptability of location
- Attention paid not just to the technical tests but comparison of them in relation to previous tests
- Identify and rectify trends suggesting possible deterioration

