

A Guide to IR(ME)R for Referrers

**Ionising Radiation (Medical Exposure) Regulations
2017**

IR(ME)R



Radiology Department

Information for Staff

The Ionising Radiation (Medical Exposures) Regulations 2017 (IR(ME)R) lay down basic measures for the protection of patients from unnecessary or excessive exposure to medical X-rays.

They also have specific guidance for Employers, Practitioners, Operators and Referrers in their responsibilities as Duty Holders.

This leaflet is intended to be a helpful guide to the practical applications of the regulations for Referrers and includes a section on the basic principles of radiation safety.

Categories of Duty Holder

The regulations identify different categories of duty holder, each of whom has responsibility to ensure the safe administration of ionising radiation to patients undergoing medical exposures. The duty holders we are concerned with in this leaflet are:

- The Employer
- The Referrer
- The Practitioner/Operator

The Employer

The Employer (The Northern Devon Healthcare Trust) is responsible for putting into place a system of policies, protocols and procedures* which will govern referrals ensure that justification of exposures takes place, and **that a clinical evaluation of all radiographs is recorded**. The aim is to ensure that radiation doses to patients are kept as low as is reasonably practicable.

The Employer is responsible for ensuring that the diagnostic findings and clinical evaluation of each medical exposure is recorded in the patient's notes. If it is known *before* an exposure that no clinical evaluation will occur, then the exposure cannot legally be **justified** and therefore should not take place.

The Medical Exposures Directive requires that **each request for a medical X-ray must be justified by a practitioner or authorised by a radiographer (Reg.6.(1).(a))** prior to exposure being made.

**These procedures can be found on the Radiology pages of 'BOB' and the NDHT website.*

Justification

Practitioners and Operators are responsible for justifying and authorising individual medical exposures based upon assessment information supplied by the Referrer.

The Practitioners and Operators must consider:

- The specific objectives of the exposure and the characteristics of the patient involved.
- The total potential or therapeutic benefits, including direct health benefits to the individual and society.

- Any potential detriment to the individual.
- The efficacy, benefits and risks of available alternative techniques.
- The Practitioner must pay special attention to:
 - The necessity of the exposure
 - Exposures on medical-legal grounds
 - Exposures that have no direct health benefit for the individual.
- The urgency of the exposure in cases involving an individual where pregnancy cannot be excluded, in particular if the abdominal and pelvic regions are exposed; this also applies to those who were female at birth but may be transgender or non-binary.

If the Practitioner or Operator considers the request not to be compliant with IR(ME)R he or she is **legally bound to refuse** to justify the imaging request.

Practitioners and Operators

The role of the Practitioner (usually the Radiologist) and the Operator (usually the Radiographer) can appear to overlap. The Practitioner (Radiologist) must be sufficiently knowledgeable to be able to **justify** an exposure before **authorising** it to take place. If, in certain circumstances it is not practicable to obtain justification from the Practitioner, the Operator can authorise an exposure for some examinations under Practitioner protocols or guidelines. (reg 5.4).

Practitioners and Operators must follow departmental guidelines and protocols as authorised by the Employer.

Practitioners and Operators have a legal obligation to refuse to justify an exposure when insufficient or incorrect clinical information is provided.

Referrers

Medical and Non-medical Practitioners who act as Referrers are classed as Duty Holders who are entitled in accordance with the employer's procedures to refer individuals for medical exposure to a Practitioner, and must be aware of their responsibilities under IR(ME)R 2017 before they may refer patients for diagnostic imaging examinations involving the use of ionising radiation.

Accepted Referrers for diagnostic examinations involving the use of ionising radiation for the NDHT are:

Medical:

- Hospital Consultants
- Junior Doctors

- General Practitioners
- Dental Practitioners

Non- Medical:

- Nurse Practitioners
- Podiatrists
- Radiographers
- Extended Scope Physiotherapists
- Allied Health Professionals
- Speech and Language Therapists (Video Fluoroscopy only)

Referrers have the legal obligation to provide all necessary clinical information relating to the patient and the examination.

In order to avoid an unintended radiation exposure or wrong imaging investigation on a patient, all imaging requests **must correctly identify** the individual for whom the examination is intended. Therefore, imaging request forms must bear at least three patient identifiers from the following list;

- Full name,
- Address
- Postcode
- Date of birth
- Hospital or NHS number if known.

Where the patient's identity is unknown, standard Trust identification procedures must be followed. (NDHT Patient Identification Policy)

For follow-up /out-patient referrals, the patient's telephone number is also desirable.

Clinical information **must include** details of previous diagnostic examinations and/or medical records relevant to the medical exposure requested. Without this information the Practitioner (Radiologist) or the Radiographer will be unable to consider the potential benefits or detriment of the x-ray request, and will therefore be legally unable to justify the exposure. The request will be sent back to the Referrer for more clinical information.

If the Practitioners consider a medical exposure cannot be justified, **they will not legally** be able to proceed. This decision will then be communicated to the Referrer.

Referrals for medical exposures should be made in accordance with documented referral criteria. The criteria used by the NDHT will be based on those provided in the **"iRefer - Making the best use of clinical radiology"** document, published by the **Royal College of Radiologists***.

** iRefer is available from the radiology pages of the Trusts website.*

Referrals can be made to the Radiology Department electronically via Trackcare or via written request.

For more guidance on making a referral for diagnostic imaging please refer to:
Making a Referral for Diagnostic Imaging Standard Operating Procedure

<http://ndht.ndevon.swest.nhs.uk/wp-content/uploads/2017/09/IRMER-procedure-2-SOP-Making-a-Referral-for-Diagnostic-Imaging-V1-0-Updated-1.pdf>

Please see Appendix B for 'Pause and Check' reminder.

There is no legal requirement within the Regulations that Medical / Non-Medical Referrers are trained in radiation safety / IRMER awareness prior to being entitled to act as referrers; however it is normal practice for Radiology Departments to require such training to be undertaken.

Medical Referrers holding current GMC registration are deemed to have received this training prior to their registration. IR(ME)R Training for Medical and Non-Medical Referrers is available via the Trust's e-learning platform 'STAR'. Modules covered are indicated below.

Medical Referrers

| | |
|------------------------|---|
| IRMER module 03 | <p>Legal Requirements – Regulations</p> <ul style="list-style-type: none"> • Ionising Radiation (Medical Exposure) Regulations 2017 - IR(ME)R 2017 03_01_02 |
| IRMER module 01 | <p>Radiation Hazards and Dosimetry</p> <ul style="list-style-type: none"> • Risks v Benefits in Patient Exposure 01-02-05 • Use of Medical Exposures in Special Circumstances 01-03-01 |

Non-medical Referrers

| | |
|------------------------|---|
| IRMER module 03 | <p>Legal Requirements – Regulations</p> <ul style="list-style-type: none"> • Ionising Radiation (Medical Exposure) Regulations 2017 - IR(ME)R 2000 03_01_02 |
|------------------------|---|

| | |
|-------------------------------|--|
| <p>IRMER module 01</p> | <p>Radiation Hazards and Dosimetry</p> <ul style="list-style-type: none"> • Biological Effects of Radiation 01-02-01 • Examples of Radiation Dose 01-02-04 • Risks v Benefits in Patient Exposure 01-02-05 |
| | <p>Special Circumstances</p> <ul style="list-style-type: none"> • Use of Medical Exposures in Special Circumstances 01-03-01 |
| <p>IRMER module 02</p> | <p>Management and Radiation Protection of the Patient</p> <ul style="list-style-type: none"> • Patient Selection <p>The Justification of Patient Exposure 02-01-01</p> |

Non-Medical Referrers

Referral protocols have been agreed between the Radiology Department and the appropriate Directorate for all non-medical referrers.

Registered Nurses and Allied Health Professionals (Non-Medical Referrers) must contact the Radiology Department for an application form if their job role requires them to refer patients for diagnostic imaging.

Application forms must include evidence of continuing professional development which demonstrates that the applicant is sufficiently competent in patient assessment, history taking and decision making, to supply pertinent medical data to enable the Practitioner to 'justify' the exposure.

Applications from Non-Medical Referrers will be considered at scheduled monthly Radiology Management Group (RMG) Meetings.

Non-Medical Referrers must understand their professional accountability arising from their professional code of conduct and any medico-legal issues related to their scope of practice and complete the IRMER awareness training modules on STAR to inform them of the risks associated with exposure to ionising radiation.

The Radiology department must have evidence of successful completion of the IRMER training modules (see above) before Non-Medical Referrers can be appointed as Duty Holders and entitled to act as 'Referrers' at NDHT. Once entitled, the Referrer functions should be added to the individual's job description or specified Scope of Practice.

(Nb. The Workforce Development Department provides the Radiology Department with a monthly print out of completed modules).

It is the Referrer's responsibility to inform the radiology department of any change of name in order to be compliant with IR(ME)R procedures and regulations.

Responsibilities of Referrer

The Form:

The X-ray request form is a **legal document** and must be filled in accordingly. It is essential that correct patient identification details are recorded as well as giving sufficient clinical and medical data and a provisional diagnosis. Referrers must provide a legible signature uniquely identifying the Referrer and a contact number for any queries.

Informing the Patient of the risk and benefit of Radiation Exposure:

Under IR(ME)R 2017 "wherever practicable, and prior to an exposure taking place, the patient or their representative is provided with adequate information relating to the benefits and risks associated with the radiation dose from exposure".

In the first instance this discussion should be had with the patient by the Referrer **prior** to referral for X-ray. This should include how the imaging will allow them to be able to make a diagnosis or monitor the progress of the patient's treatment, and how the benefits from having the X-ray, and making the right diagnosis or providing the correct treatment, outweigh the very low risk involved with the X-ray itself.

It should be emphasised that the risk of cancer induction is extremely low and an indication of approximate average UK background equivalent radiation time given; for example a chest X-ray should be described as being equivalent to a few days of average UK background radiation, and a CT Chest, Abdomen and Pelvis equivalent to approximately 4 years average UK background radiation (UK Background equivalent radiation times are shown in Appendix A).

The Possibility of Pregnancy:

The Referrer is also required to check the LMP (Last Menstrual Period) dates of all individuals of childbearing capacity aged 12 – 55 years before referring them for an X-ray of the abdominal, pelvic or upper femoral regions; this also applies to those who were female at birth but may be transgender or non-binary.

Checking of pregnancy status is especially important for patients who will be under anaesthetic when the X-ray is required. **LMP DATES FOR THESE PATIENTS MUST BE CHECKED BEFORE THEY ARE ANAESTHETISED.**

Failure to do so may result in the Radiographer being unable to carry out the examination until checks can be made. This might result in patients spending longer under anaesthetic and will interrupt the operative procedure.

Patients who have doubts about their dates, or could be pregnant, should be offered a pregnancy test before the anaesthetic.

Referrers should clearly indicate on the request form if it is known or suspected that a patient is pregnant at the time the request is made and must indicate that the clinical necessity of performing the examination overrides the question of possible pregnancy.

Nurse Practitioners intending to refer patients known or suspected to be pregnant for X-rays should first consult a Medical Officer in their area of work. If the X-ray is deemed necessary, the Radiological Practitioner should be informed via the request form so that adequate shielding of the foetus can be arranged.

For patients that are known to be pregnant there is a consent form available on BOB, or from the radiology department, that must be completed with the patient by the referrer prior to referral and sent with the patient when they go to the radiology department for their imaging.

Recording of Clinical Evaluation:

It is the responsibility of the referrer (or nominated representative) to carry out and record a clinical evaluation of each examination in the patient's case-notes. This must take place irrespective of whether a formal report has been issued by a Radiologist. Where Radiologist reports are available, they are entered onto CRIS where they are also visible on the PACS system.

Failure to provide a written clinical evaluation can lead to clinical risks. If an image is not going to be reported by a Radiologist / Advanced Radiographer Practitioner, the referrer **must** record their own observations of the image in the patient's notes.

In the event of an unexpected finding the advice should be sought from a Radiologist or specialist in the required medical speciality.

It is also helpful:

If the referrer would consider the following when referring a patient for an X-ray:

- The need for pain relief and removal of radio-opaque objects prior to X-ray as this can prevent unnecessary repeat exposures due to patient movement, or obscuration of the area under investigation.

- Patients who are informed are generally more co-operative, so please tell them why you are requesting an x-ray, where they are going and what to expect.

Finally:

Any patients, who undergo a procedure that was not intended as a result of mistaken identification, or other procedural failure, and who has consequently been exposed to an unnecessary ionising radiation dose, should be considered as having received an unintended dose of radiation. (Regulation 4.(5))

The detailed investigation required by this regulation should be aimed at;

- Establishing what happened
- Identifying the failure
- Deciding on the remedial action required to minimize the chance of a similar failure in future.
- Estimating the doses involved and recording the incident.

'ALARP'

The Legislation assumes that no radiation dose is entirely free from risk and Radiographers have a legal duty to ensure that doses are '**As Low As Reasonably Practicable**' - this includes refusing to carry out procedures if the risk /benefit is not clear.

“To x-ray or not to x-ray? - That is the question!”

Main criteria: Will this examination influence /affect the immediate management of the patient?

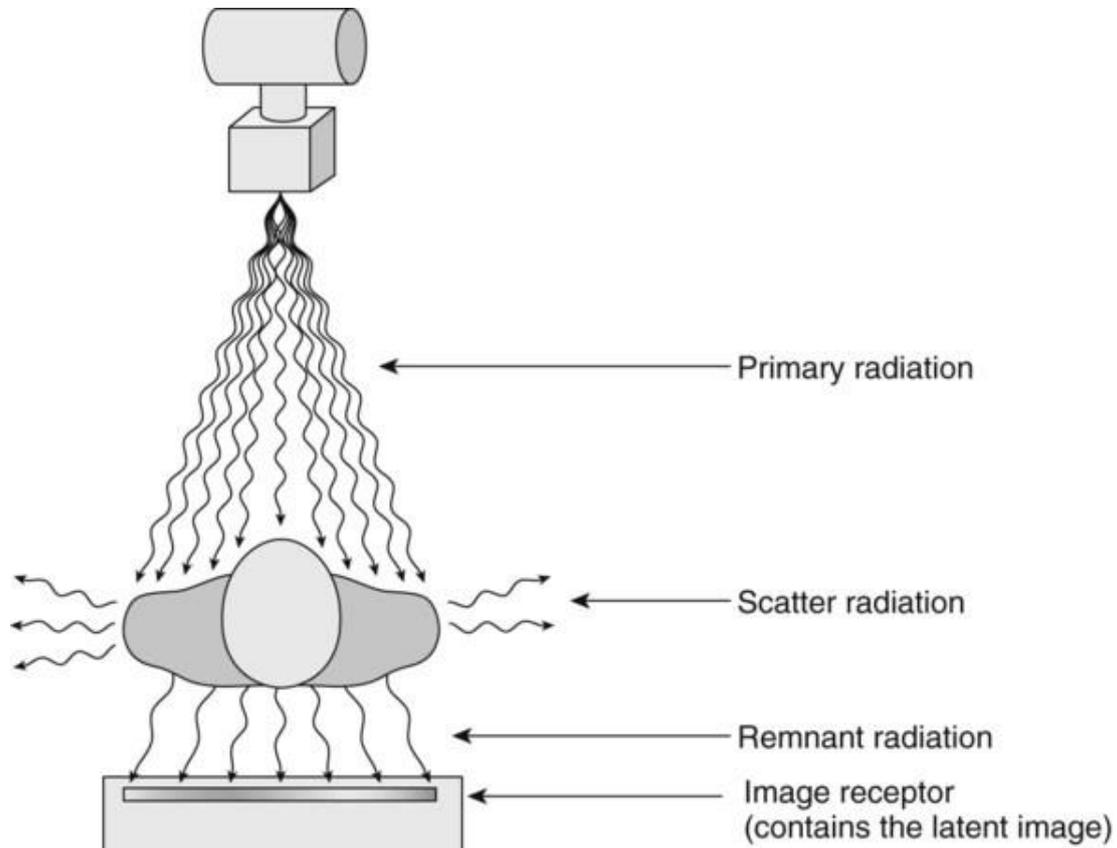
Cochrane's Law : “Before you request a test, you should first ask yourself what you are going to do if the test is positive, then ask yourself what you are going to do if the test is negative. If the answer is the same, do not do the test.”

What is radiation?

We are surrounded by naturally occurring radiation every day of our lives, arising from various sources, e.g. minerals in the ground and cosmic rays from outer space. This radiation is called background radiation. In addition to this, we may be exposed to artificially generated radiation, e.g. X-rays. X-rays form part of the electromagnetic spectrum to which microwaves, visible light and radio waves also

belong. The only difference between these waves is their wavelength. The shorter the wavelength the greater the potential for biological damage.

When X-rays hit body tissue they are either absorbed or scattered losing energy to the tissues in the process. It is the absorption of this energy that causes biological damage.



In radiation protection we talk about two types of radiation: primary radiation and secondary (or scattered radiation).

Primary radiation is emitted from the X-ray tube and directed towards the patient to create an image.

Scattered radiation is primary radiation, which has been scattered from the patient during the exposure. It is this scattered radiation to which staff may be exposed when supporting or standing close to a patient being X-rayed. This 'scattered' radiation energy may then be absorbed by the member of staff.

Other patients on the ward who are too close to the patient being X-rayed are also exposed to this scattered radiation. On the wards it is important to remember that partition walls do not stop the primary beam (i.e. the beam which is directed at the patient). Therefore, care must be taken to prevent exposure of patients in adjacent

bays. Keeping a distance of 2 meters around the patient is generally considered sufficient to reduce scattered radiation to safer levels.

Both scattered and primary beam radiation is dispersed immediately following an X-ray exposure. Therefore, the area in which the procedure occurs is safe to enter immediately after the X-ray.

How much radiation do we receive from X-rays?

The amount of radiation that a patient receives from a chest X-ray is equivalent to 3 days natural background radiation. This is considered to be a low dose; other examinations such as CT give a larger patient dose (on average 2 1/2 years natural background).

Most radiographers working with radiation every day receive no measurable dose. This is because stringent precautions are observed in practice. These precautions are extended to staff on the wards who may be required to assist with mobile X-ray examinations. Radiographers are specially trained in radiation safety and are responsible for the safety of everybody present during an X-ray procedure.

The effects of radiation exposure on the body

Effects such as radiation burns and vomiting are only seen when someone has received very large amounts of radiation. They are not caused by diagnostic levels of radiation. However, low amounts of radiation do carry a risk of causing cancer. At diagnostic levels (supposing an average dose of 0.02mSv per year, less than 1/10 average background radiation) this risk is very small, about 1 in 1,000,000 for a whole year's worth of helping with ward chest X-rays – ***provided that the right precautions are taken.***

Principles of radiation protection

There are three main ways to prevent unnecessary X-ray exposure –

Distance is by far the most effective radiation protection method. By doubling your distance from the X-ray machine you quarter your dose, not just half as you might expect. So **STAND BACK**.

Lead aprons are very effective against scattered radiation, but offer only minimal protection from primary radiation. On occasion, the radiographer may supply you with a lead apron to wear, whilst supporting a patient, during the X-ray. Wearing the apron whilst doing this, ensures that you are safe.

Time – Whenever possible the patient should be brought to the Radiology Department, to reduce the number of times that X-rays are generated on the ward. Similarly, in areas such as SCBU, it is important that the same person does not support all the patients.

Pregnancy

Pregnant staff should inform the Radiographer of their presence on the ward, or when accompanying patients to the Radiology Department, as the foetus is particularly sensitive to radiation - however, strict observation of the safety procedures and the radiographers' instructions will be sufficient to protect the foetus.

Remember – distance from the source of the X-ray beam is the best protection against exposure to ionising radiation in a medical environment.

Theatres

The Referrer who is responsible for requesting the X-ray is required to check the LMP (last menstrual period) dates of patients who will require an X-ray during a surgical procedure **before the patient is anaesthetised**.

Patients who have any doubts about their dates, or could be pregnant, should be offered a pregnancy test **before** they are anaesthetised.

Further Information

If you have any questions about radiation the best person to answer them is the Radiographer. Please contact the Radiology Department at NDDH on 01271 311678 or extension 3678 from inside the Hospital. Out of hours bleep 042 to speak to the on call Radiographer.

Alternatively you could contact:

The Radiation Protection Supervisors: Jane Martin janemartin4@nhs.net ; Julian Fuery julianfuery@nhs.net ; Gill Kite gillian.kite@nhs.net ; Alex Werren alexander.werren@nhs.net ; Heather Mower h.mower@nhs.net

The Radiology Governance Lead: Gill Kite gillian.kite@nhs.net

Relevant Regulations, Policies and Procedures

Ionising (Medical Exposures) Regulations 2017 Statutory Instruments 2017 No 1322
<http://www.legislation.gov.uk/ukxi/2017/1322/made>

Northern Devon Healthcare Trust Medical Radiation Policy
<http://ndht.ndevon.swest.nhs.uk/wp-content/uploads/2015/07/Medical-Radiation-Policy-v1.0-30Jul15.pdf>

IR(ME)R 2000 Employer's Procedures
<http://ndht.ndevon.swest.nhs.uk/wp-content/uploads/2017/09/IRMER-employers-procedures.pdf>

Standard Operating Procedure: Scope of Entitlement
<http://ndht.ndevon.swest.nhs.uk/wp-content/uploads/2017/09/IRMER-procedure-1-SOP-Scope-of-Entitlement-V1-0-Updated-1.pdf>

Standard operating Procedure: Making a Referral for Diagnostic Imaging
<http://ndht.ndevon.swest.nhs.uk/wp-content/uploads/2017/09/IRMER-procedure-2-SOP-Making-a-Referral-for-Diagnostic-Imaging-V1-0-Updated-1.pdf>

Standard Operating Procedure: Justification and Authorisation
<http://ndht.ndevon.swest.nhs.uk/wp-content/uploads/2017/09/IRMER-Procedure-5-SOP-for-justification-and-Authorisation646-2nd-Nov.pdf>

Standard Operating Procedure: Recording of clinical evaluation and dose
<http://ndht.ndevon.swest.nhs.uk/wp-content/uploads/2017/09/IRMER-Procedure-9-SOP-Recording-clinical-evaluation-and-dose-V1-0-Updated.pdf>

Standard Operating Procedure: Providing information on risk and benefit of radiation exposures
<https://www.northdevonhealth.nhs.uk/wp-content/uploads/2017/09/IRMER-Providing-Information-on-Risk-and-Benefit-of-Radiation-Exposures.pdf>

Standard Operating Procedure: Carers and Comforters
<https://www.northdevonhealth.nhs.uk/wp-content/uploads/2017/09/IRMER-Carers-and-Comforters-SOP.pdf>

Appendix A

UK Average Background Radiation Equivalent Times for Radiological Exams

RADIOGRAPHY

A few days:

Dental (intraoral and OPG) (1 day)

Chest (2 days)

Limbs and Joints (except hips) (1 day)

C-spine (4 days)

A few weeks:

Hip (2 weeks)

A few months:

Abdomen (2 months)

Pelvis (2 months)

L-spine (3 months)

T-spine (2 months)

CT

A few months:

Head (6 months)

High resolution chest (5 months)

A few years:

Chest (2 years)

Chest and abdomen (3 years)

Chest, abdomen and pelvis (4 years)

Abdomen (2 years)

Abdomen and pelvis (3 years)

Pulmonary Angiography (2 years)

C-spine (1 year)

KUB (2 years)

Virtual colonoscopy (4 years)

FLUOROSCOPY

A few weeks:

Orthopaedic pinning (3 weeks)

A few months:

HSG (2 months)

Fluoroscopy guided injection (2 months)

T-tube Cholangiography (5 months)

Facet joint injection (2 months)

T-tube cholangiography (5 months)

About a year:

Barium (or water soluble) swallow (7 months)

Barium (or water soluble) enema (10 months)

Barium meal (9 months)

Nephrostomy / Nephrostography (13 months)

Sinography (9 months)

ERCP (1 year)

Femoral angiography (1 year)

DXA (about 2 days)

References

1. Ionising Radiation Exposure of the UK Population: 2010 Review, PHE, 2016
2. HPA-CRCE-012 Frequency and Collective Dose for Medical and Dental X-ray Examinations in the UK 2008, HPA, 2010

Appendix B

Diagnostic Radiology Referral

Have you “Paused & Checked”?

An IR(ME)R Referrers checklist for referring a patient for a diagnostic imaging examination

| | | |
|----------|------------------------------|--|
| P | Patient | <p>Ensure correct patient (3-point ID)</p> <p>Ensure it is physically possible for the patient to undergo the examination (e.g. any mobility issues)</p> <p>Ensure patient has been given adequate information and understands and agrees to examination</p> |
| A | Anatomy | <p>Ensure correct body part/laterality specified</p> |
| U | User Checks | <p>Confirm most appropriate investigation and consider non ionising radiation alternative (use of iRefer/local referral guidelines)</p> <p>Check previous investigations</p> <p>Confirm timing of examination (is date required clear?)</p> <p>Ensure pregnancy/breastfeeding status is verified</p> <p>Ensure any special needs/interpreter/disabilities/mobility documented (eg hoist required?)</p> <p>Ensure implantable cardiac defibrillator devices documented</p> <p>Ensure allergies documented and appropriate pathology results are available where requested</p> |
| S | System & Settings | <p>Confirm correct examination (code) requested</p> <p>Confirm correct imaging modality selection</p> <p>Confirm relevant clinical information is adequate to enable the Practitioner to justify the examination</p> <p>Confirm relevant clinical information will assist in the evaluation of the study</p> |
| E | End | <p>Confirm entitled Referrer against IR(ME)R procedures – eg unique identifier/correct user login</p> <p>Final check that this is the CORRECT patient</p> <p>Confirm the above and submit request</p> |
| D | Draw to a Close | <p>Ensure you have received an evaluation of the examination</p> <p>Ensure the results are discussed with the patient</p> <p>Confirm whether further investigation is required</p> |



IR(ME)R requires all duty holders to comply with their local employer's procedures. This 'pause and check' poster does **not replace** these procedures but represents a shortened summary of the main **checks**. **You must adhere to your local procedures at all times.**