Healthcare Improvement Scotland | Inspections and reviews
To drive improvement

Announced Inspection Report: Ionising Radiation (Medical Exposure) Regulations 2017

Service: University Hospital Ayr, Ayr

Service Provider: NHS Ayrshire and Arran

28–29 April 2026

NHS SCOTLAND

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Background

Healthcare Improvement Scotland has a statutory responsibility to provide public assurance about the quality and safety of healthcare through its inspection activity.

Our focus

The focus of our inspections is to ensure each service is implementing IR(ME)R 2017. Therefore, we only evaluate the service against quality indicators that align to the regulations. We want to find out how the service complies with its legal obligations under IR(ME)R 2017 and how the services are led, managed and delivered.

About our inspection

We carried out an announced inspection to University Hospital Ayr (UHA), NHS Ayrshire and Arran (NHS A&A) on Tuesday 28 and Wednesday 29 April 2026. We spoke with the clinical director of radiology /operational IRMER lead, head of imaging, site superintendent radiographer, the medical physics expert (MPE), radiographers, modality leads and the cardiology lead. This was our first inspection to this facility.

Based in Ayr, University Hospital Ayr provides dental, mobile and general radiography, computed tomography (CT), fluoroscopy and interventional suite.

The inspection team was made up of two inspectors.

What action we expect NHS Ayrshire and Arran to take after our inspection

The actions that Healthcare Improvement Scotland expects NHS Ayrshire and Arran, University Hospital Ayr to take are called requirements and recommendations.

- **Requirement:** A requirement is a statement which sets out what is required of a service to comply with the Regulations. Requirements are enforceable at the discretion of Healthcare Improvement Scotland.
- **Recommendation:** A recommendation is a statement that sets out actions the service should take to improve or develop the quality of the service but where failure to do so will not directly result in enforcement.

This inspection resulted in 0 requirements and 2 recommendations. Requirements are linked to compliance with IR(ME)R.

Safety Culture and Leadership	
Requirements	
	None.
Recommendations	
	None.

Implementation of IR(ME)R requirements	
Requirements	
	None.
Recommendations	
a	UHA should review QA testing schedule for all diagnostic imaging equipment is in line or benchmarked against published guidance or where it deviates, this is part of a clear governance process (see page 18).
b	NHS A&A should ensure the results of all clinical audits undertaken at UHA are included in the reporting mechanism EP20 and or separately to the IRMER operational lead for inclusion in the IR(ME)R assurance mechanism (see page 19).

Risk and Communication	
Requirements	
	None.
Recommendations	
	None.

An improvement action plan has been developed by the NHS board and is available on the Healthcare Improvement Scotland website.

We would like to thank all staff at University Hospital Ayr for their assistance during the inspection.

2 What we found during our inspection

Safety Culture and Leadership

This is where we report on how clear the service's safety culture and how supportive its leadership and culture is.

Key questions we ask:
How clear is the service's vision and purpose?
How supportive is the culture and leadership of the service?

Our findings

There was a strong ionising radiation safety culture in place with clear a governance structure and team awareness

Safety culture

There was a consistent message that there was a positive culture to minimise the risk of patient harm and ensure practices are safe. It was evident that the Employer's Procedures (EPs) and associated safety management system provide a platform for the safe delivery of ionising radiation.

Staff reported feeling comfortable raising concerns and discussing issues openly with seniors. Clear reporting lines were in place for concerns to be escalated from operators to superintendents and onwards to higher governance committees where necessary.

Staff confirmed that they monitored their own practice and, as part of their role, identified and challenged any deviations or irregularities in procedures or activities that could result in error or inappropriate action.
Taking timely corrective action where required. Staff felt comfortable questioning referrals and ensuring the appropriate information was provided to allow for a referral to be justified. This included redirecting to diagnostics techniques not involving ionising radiation. It was demonstrated that the learning from events has been used to undertake changes to workflows, for example, to ensure that clinical evaluations are being returned to a named consultant.

We saw "PAUSED and checked" posters prominently displayed in each clinical room in the radiology department to remind staff to take the time when carrying out appropriate checks before acquiring patient exposures. Staff confirmed that they had the opportunity to pause to ensure the correct details when imaging patients.

Staff also reported feeling comfortable raising any equipment issues directly with engineers.

Requirement

- No requirements.

Recommendation

- No recommendations.

Implementation of IR(ME)R requirements

This is where we report on how well the service implements the requirements of IR(ME)R and manages and improves performance.

Key questions we ask:
How well does the service manage and improve performance?
How does the organisation demonstrate the safe use of ionising radiation (patient exposure)?

Our findings

There was a clear patient pathway that implemented radiological safety at all stages. There were robust systems in place to demonstrate the appropriate training, entitlement and scope of practice were in place.

Employer's procedures

EPs were available to inspection team prior to announced inspection date.

All staff we spoke with were familiar with the EPs and could easily locate them on the staff intranet and the document management system. It was reported that any changes or amendments to documents are communicated through MS Teams channels and email, ensuring all staff are aware of changes.

Requirement

- No requirements.

Recommendation

- No recommendations.

Training

We found comprehensive training records in place for staff involved in medical exposure to radiation. NHS A&A provide induction and ongoing training. We were told that operators must be trained on each of the different types of equipment before using it. All the radiographers we spoke with told us they had received appropriate training. Training records were comprehensive and clearly demonstrated the training delivered.

Requirement

- No requirements.

Recommendation

- No recommendations.

Entitlement

A radiographer's training record is closely linked to their entitlement. We reviewed a sample of records and saw the entitlement records corresponded to the training record.

Requirement

- No requirements.

Recommendation

- No recommendations.

Referral

We reviewed several referrals as part of our inspection and discussed the referral process with staff in UHA. The hospital demonstrated a strong and well embedded referral process in line with IR(ME)R, particularly in relation to identifying the duty holders in the request. The referral system is online for most requests with only a small cohort of referrers using a paper referral for example dental and NHS boards out with NHS A&A. Referrers are responsible for ensuring they provide adequate clinical information to support the justification of a request. Referrers have access to iRefer to support staff choose the most appropriate type of imaging request and the type of clinical information required to support the justification.

An individual can only make a referral once their name has been added to the radiology information system (RIS). To be added to the RIS an individual must have completed their induction, and confirmation is provided to Picture Archiving and Communication System (PACs) managers who will update the system allowing referrals to be made.

All staff must provide the name of lead consultant when making a referral. A referral will be rejected if the name of the lead consultant is not included. This step was added to ensure that the consultant responsible for the patients care receives the clinical evaluation in addition to the referrer. Referrals without a lead consultants name included will be rejected and the referrer informed the reason why.

There are two medical staff groups identified on the RIS who can refer, doctors and consultants. This ensures that a referral is from appropriately entitled medical staff and to whom the clinical evaluation should be sent.

A very robust system is also in place for non-medical referrers (NMR). NMRs are identified on the system when referring by using certain codes based on the

examination that they are requesting. For example, NMR2, NMR8. They are also identified by their name followed by "NMR" in brackets. A spreadsheet is available to check that the NMR requesting is entitled, and the examination is within their scope of practice. All staff have access to this spreadsheet.

Staff showed a clear understanding of the referral process and were confident in rejecting referrals if there was not the correct or sufficient information provided in the request. No amendments are made to existing referrals, instead, they contact the referrer via email to confirm the referral has been rejected and the reason why. A new referral is then required to be submitted with the appropriate information.

It was confirmed that if the referral came from a person that was not entitled to refer, this was also rejected. A feedback mechanism is in place to inform referrers that their request was rejected and why, this is also a learning opportunity for referrers.

A referrer can cancel a referral on TrakCare if it has not been scheduled on RIS. Otherwise, the referrer must phone the radiology department to cancel the referral. Staff reported that this process was well known by referrers.

Requirement

- No requirements.

Recommendation

- No recommendations.

Justification

UHA demonstrated a clear understanding of the justification process. Locally the term "vetted" is used to describe justification and all staff we spoke to were aware of its meaning and application in the patient pathway.

The name of the individual undertaking justification was clearly recorded on the RIS request, showing accountability and traceability.

Some radiographers are entitled to authorise certain imaging examinations under protocol, where the request meets defined criteria. The authorisation guidelines are outlined in the EPs *(RG-IOP-CT-WP-ALL-2 Authorisation of CT scans by Radiographers, RG–IOP–CT-WP-ALL-1 Authorisation Guidelines for CT).*

As per the document EP RG 5 Justification and/or Authorisation of Medical Exposures, *"All qualified radiographers with HCPC registration employed within NHS Ayrshire & Arran have been authorised as entitled practitioners by the Head*

of Clinical Service due to their qualifications, clinical experience and knowledge for all plain film examinations."

Staff we spoke to have a clear understanding of their scope and confirmed that if the request did not meet the referral criteria or it was out of their scope they would not proceed with the exposure.

The consultant radiologist can change the requested protocol if they consider it appropriate to do so.

Requirement

- No requirements.

Recommendation

- No recommendations.

Optimisation

UHA demonstrated a strong approach to optimisation in accordance with IR(ME)R requirements including carrying out audits, quality assurance (QA) tests and calibration of equipment.

Staff were knowledgeable about selecting appropriate protocols and making adjustments if required. Staff were aware of the need to use preset protocols for when children are being imaged compared to using the adult settings.

EP12 Assessment of Patient Dose, details where information relevant to the radiation dose delivered to each patient undergoing a medical exposure is recorded.

A positive example of optimisation we seen in practice was a staff member combining examinations to obtain the required information instead of acquiring two separate scans which would result in an additional dose.

Those justifying image requests were also aware of non-ionising imaging alternatives which would reduce the dose a patient may be exposed to.

MPE staff carry out various dosimetry surveys and audits, covering a range of equipment. The audit seeks to provide assurance that the delivered doses meet the agreed diagnostic reference levels (DRL's). The MPE will investigate any trends where doses are above the DRL. The dose survey information is used to inform local DRL's. We were told all DRL's in UHA either meet, or are below, the national DRL's.

For procedures carried out by the cardiologist there are agreed skin DRL's. These are not limits but act as a reference point. The expected dose is affected by different factors such as the size of the patient. When undertaking a procedure an alarm will sound when the DRL is reached. The cardiologist confirmed that during procedures they will where practical try and mitigate dose when they are nearing the DRL as part of a dynamic risk assessment to balance dose with patient outcomes. The lead cardiologist confirmed that all staff work to the standards set out by the British Cardiovascular Society and deliver a consistent approach to the use of imaging and consistent use of ionising radiation.

If the recorded value of an exposure is outside the reference point, it will be discussed and the reasoning is documented in the cardiology spreadsheet which is transferred into the clinical portal.

Dose survey data are produced and are considered by the relevant Image Optimisation Team (IOT).

Requirement

- No requirements.

Recommendation

- No recommendations.

Operator

Detailed conversations were had with various operators working across CT, plain film, dental and interventional services. They demonstrated a strong awareness of the department's procedures and processes and IR(ME)R responsibilities. They described how they would confirm a patients ID, make enquiries regarding pregnancy, carrying out checks on the imaging required and how they would review the dose information following an exposure.

Previous incidents were mentioned and staff discussed wrong detector issues and how they avoid this in practice.

Staff showed inspectors the patient pathway from referral to imaging and clinical evaluation including the audit trail on RIS for each request and any comments associated with a request.

Staff demonstrated how they check the entitlement and scope of practice when justifying a request prior to exposure. We were shown where staff find the referrer, practitioner, justifier, and operator associated with each referral along with where the pregnancy status and patient identification is recorded.

Staff discussed and demonstrated the use of both static and mobile equipment including collimation, detector selection, protocol selection, the adjustment of settings to optimise images, and the positioning of patients. Staff also showed a robust awareness of NHS A&A procedures that are used to investigate any dose that is above the DRL by a set factor.

We discussed the use of contrast agents in fluoroscopy and cardiology imaging techniques. Staff confirmed that they have been trained in the use of equipment and imaging using contrast.

Requirement

- No requirements.

Recommendation

- No recommendations.

Records

Record keeping within UHA was of a very high standard. EPs are stored on an online system, with staff confirming they all had access and were aware of how to access EPs and other relevant documents if required.
We looked at the information recorded on the RIS and noted staff had documented the following:

- correct patient information
- identification checks
- scanned documents, such as pregnancy check questionnaires
- details of the referrer and operator
- recorded dose
- justification, and
- clinical evaluation.

Patients' documentation was comprehensive and clear. UHA uses RIS to record the patient pathway from referral to exposure. The system has a clear audit trail of any changes to requests and identifies all relevant individuals involved in the patient pathway. It also allows for raising alerts or comments when necessary. The IR(ME)R duty holder roles were also clearly identifiable on the patient records showing accountability throughout.

Requirement

- No requirements.

Recommendation

- No recommendations.

Patient identification

All staff we spoke with could clearly describe the required checks for patient identification using a 3-point check. For hospital inpatient's their name band can be used as a secondary check and this can also be used if an inpatient is unable to identify themselves verbally. For a patient who is cognitively impaired a member of staff from the ward who can identify the patient must accompany them. If a student identifies the patient this is also reconfirmed by an entitled operator.

Staff also told us they ask patients if they aware of the exam they are having. This is a secondary check to highlight any potential errors and clarify laterality with the patient. The operator who identifies the patient, updates the records on the RIS system.

Once patient identification checks are complete, they are recorded the RIS.

Requirement

- No requirements.

Recommendation

- No recommendations.

Clinical evaluation

All radiologists who are Fellows of the Royal College of Radiologists (RCR) are entitled to carry out clinical evaluations.

UHA had reporting radiographers. It was confirmed that these staff had completed the relevant inhouse training and training records and the appropriate entitlement and scope of practice was in place. Peer review audits are carried out on 5% of radiographers' clinical evaluations, by the consultant radiographer.

There were clear systems in place for the clinical evaluation of images. Images are reported on the RIS system and the referrer and consultant responsible for the patient is notified that a report is available.

Within cardiology, it is the responsibility of the cardiologist to record the procedure or report in the patient notes.

Regular REALM and Multi-Disciplinary Team meetings for radiologists and reporting radiographers occur for discussion of cases and supports the learning and reviewing of report findings and allows for a collaborative review of images.

Requirement

- No requirements.

Recommendation

- No recommendations.

Expert advice

MPE support in UHA is provided by NHS Greater Glasgow and Clyde (NHS GGC). The health physics staff are onsite at UHA and available if required. Staff told us the MPEs are contactable and available for support. However, in practice, they contact the superintendent who primarily contacts the MPE to raise any issues or queries.

It was confirmed that MPEs are involved in:

- commissioning of new equipment
- acceptance testing of new equipment
- quality assurance of equipment
- dose monitoring and dose audits
- analysis of incidents

It was confirmed that MPEs were fully involved in commissioning new equipment and discussions around replacement of equipment. In UHA, the most recent piece of new equipment was a mobile unit.

MPEs were also contacted in the event of equipment failure and concerns regarding performance of the equipment.

They also provide staff with advice on whether an incident requires to be reported to Healthcare Improvement Scotland.

Requirement

- No requirements.

Recommendation

- No recommendations.

Contracted services

A UK based contracted service is in place to support out of hours working, radiologist support, primarily for providing justifications and clinical evaluations. The contracted services have been provided with UHA's protocols and procedures and will use these when a referral is justified. Paediatric protocols have also been agreed that the contractor will use.

At this time, there were no locum radiographers in the radiology department. We reviewed the training of staff, and it was confirmed that locum staff are required undertake the same induction process as other radiographers and demonstrate a level of competency prior to operating equipment and other roles.

Requirement

- No requirements.

Recommendation

- No recommendations.

General duties in relation to equipment

QA processes are in place and routinely carried out. Staff were trained in the QA tasks appropriate for each piece of equipment, with the relevant training records signed and in place. A positive observation was a staff member explicitly stating the piece of equipment they would not undertake QA tests on as they had not been trained to, demonstrating a good awareness of their scope and responsibilities.

QA results are recorded in an online spreadsheet which flags whether the results fall out of the expected tolerances. If the tests are flagged as red and outside the accepted tolerance, a process is in place for escalation. All staff we spoke to was aware of the escalation process and who to contact.

Staff also demonstrated awareness of the need to remove equipment from clinical use if there are any concerns regarding safety or performance and the appropriate signage to use.

Staff also confirmed QA testing was carried out post engineer visit, especially if anything which affects dose was altered or changed. It was confirmed that the following QA was undertaken on the equipment in UHA.

CT

- Weekly by radiographers
- Annually by health physics

- Daily air calibration

Plain film
- Bi monthly by radiographers
- Annually by health physics

Fluoroscopy suite
- Bi monthly by radiographers
- Annually by health physics

What needs to improve
There was some uncertainty around the QA testing frequency and if the frequency was aligned to the recommendations of IPEM 91 or benchmarked against any other guidance documents

Requirement
- No requirements.

Recommendation a
- UHA should review QA testing schedule for all diagnostic imaging equipment is in line or benchmarked against published guidance or where it deviates, this is part of a clear governance process.

Clinical audit
The clinical audit form set out in *EP20 Clinical audit* requires that each service undertake an annual audit, this includes the UHA. The audit captures a variety of topics and includes the following areas:

- review of list of practitioners and operators
- entitlement, including that of NMRs
- scope of practice
- training records
- equipment and QA
- clinical evaluations and,
- DRLs

What needs to improve
EP20 Clinical audit also requires each service to provide information on any other clinical audit applicable to IR(ME)R.

Whilst it was demonstrated and confirmed that a host of clinical audits are carried out across staff groups regularly, these ad hoc audits weren't being included in the clinical audit returns. It would be beneficial to document these non-recurring audits to the wider clinical governance framework within NHS A&A.

Requirement

- No requirements.

Recommendation b

- NHS A&A should ensure the results of all clinical audits undertaken at UHA are included in the reporting mechanism EP20 and or separately to the IRMER operational lead for inclusion in the IR(ME)R assurance mechanism.

Accidental or unintended exposure

EP15 Reporting of incidents involving unintended exposure or overexposure of patients details the responsibilities and procedures to follow when a significant accidental or unintended exposure (SAUE) occurs. . Staff we spoke with understood the process of reporting and investigating incidents, and how to raise a Datix. We were told about a culture that supports the reporting of incidents. Incident learning is shared throughout the radiology department.

In the event of an incident, a Datix is raised by persons involved in the incident, alongside a Situation Background Assessment Recommendation (SBAR) paper and an internal incident form. Senior management and MPEs are informed and investigations carried out as necessary. It was reported that these incidents are also discussed at senior governance meetings such as radiation protection meetings.

This confirmed there was a positive culture that supports the reporting of incidents, and the learning from incidents is shared throughout the radiology department.

Staff also mentioned that MPE advice and support is available for all incidents, including local incidents that are not reportable.

Requirement

- No requirements.

Recommendation

- No recommendations.

Risk and Communication

This is where we report on what difference the service has made and what it has learned.

Key questions we ask:

How well does the organisation communicate with service users?

Our findings

A robust approach is in place to ensure patients who could be or are pregnant would not be exposed to unnecessary imaging using ionising radiation.

Risk benefit conversations

Document *RG6 Provision of information relating to the benefits and risks of an exposure*, outlines the risks and benefits information. The document also states that staff are available to answer any questions patients may have regarding their imaging procedures.

Within general radiology there were various posters providing information about risks and benefits of ionising radiation available in the waiting areas. These posters were visible in the areas we visited. If the patient is confined to a bed or chair the patient is to be offered a laminated copy of the poster to read by the referrer.

Risk benefit conversations for cardiology are carried out during the consenting process by the referrer.

Requirement

- No requirements.

Recommendation

- No recommendations.

Making enquiries of individuals who could be pregnant

EP8 Exposure of individuals of child-bearing potential, provides guidance for carrying out pregnancy status checks before an exposure. All radiographers we spoke with were familiar with this EP. They told us everyone aged between 12 and 55, for exposures where the primary beam was between the lower diaphragm and upper thigh, were asked the pregnancy status questions. They demonstrated how they would use a standard questionnaire and once completed scan it onto the patient record on RIS. Within cardiology they have their own “pregnancy status checking form”.

We saw information posters displayed in the diagnostic department that highlight the need to inform a member of staff of any possibility that a patient may be pregnant.

Requirement

- No requirements.

Recommendation

- No recommendations.

Carers and comforters procedures

Staff we spoke to were familiar with *EP22 Carer and comforters* which sets out procedure on how to manage carers and comforters who are required to remain with the patient at the time of imaging. All staff we spoke with described the measures they would take to reduce their exposure, or ask them to leave the room if possible. Dose constraints for carers and comforters are in place and they are provided with written information about the dose they will be exposed to.

Requirement

- No requirements.

Recommendation

- No recommendations.

Appendix 1 – About our inspections

Our approach

Healthcare Improvement Scotland has a statutory responsibility to provide public assurance about the quality and safety of healthcare through its inspection activity.

How we inspect services that use ionising radiation for medical exposure

The focus of our inspections is to ensure each service is implementing IR(ME)R 2017. Therefore, we only evaluate the service against quality indicators that align to the regulations.

What we look at

We want to find out:

- how the service complies with its legal obligations under IR(ME)R 2017 and addresses the radiation protection of persons undergoing medical exposures, and
- how well services are led, managed and delivered.

Complaints

If you would like to raise a concern or complaint about an IR(ME)R service, you can directly contact us at any time. However, we do suggest you contact the service directly in the first instance.

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