Preventing Patient Identification Incidents in Diagnostic Imaging, Nuclear Medicine and Radiotherapy – guiding principles for safe practice in the United Kingdom

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Executive summary

Patient identification incidents (errors and near misses) are uncommon in diagnostic imaging, nuclear medicine and radiotherapy in the United Kingdom (UK). Yet they continue to be an ongoing source of notifiable incidents for the UK regulators of The Ionising Radiation (Medical Exposure) Regulations 2017[1], The Ionising Radiation (Medical Exposure) Regulations (Northern Ireland) 2018[2] and The Ionising Radiation (Medical Exposure) (Amendment) Regulations 2024[3], hereafter referred to collectively as IR(ME)R.

This guidance considers how to approach patient safety differently to prevent these incidents.

For the purpose of this guidance, a patient identification incident is an error or near miss that causes, or has the potential to cause, an accidental or unintended exposure to ionising radiation. When referring to patient identification incidents throughout the guidance, this should be understood as the incorrect identification of individuals who are accessing services, either as patients, volunteers undergoing medical research, carers and comforters, or clients.

Around 45 million diagnostic imaging tests[4] are safely and effectively delivered each year. During the 2019 financial year 1,980,061 radiotherapy attendances, or 147,025 episodes of radiotherapy[5], were delivered in England and Wales. The vast majority of tests and treatments are delivered to the right person at the right time and patients receive an appropriate, justified, radiation dose. However, a small number of individuals receive a procedure where none was intended or they receive the wrong procedure. This typically happens because they are either referred incorrectly or are incorrectly identified during their appointment or attendance. Accidental or unintended exposures can be consequences of patient identification incidents anywhere in the care pathway. For this small percentage of patients, the outcomes may range from inconvenience at best to significant harm in the worst cases.

People have a reasonable expectation to receive healthcare that is intended for them and to be protected from avoidable harm. Correct identification of the patient underpins the delivery of safe healthcare. It should precede every action and interaction. Patient identification incidents are not exclusive to diagnostic imaging, nuclear medicine and radiotherapy but the focus of this guidance is on how to get it right every time in those specific patient pathways.

It is a requirement of IR(ME)R (Schedule 2: Employer's Procedures, 1(a)) "to identify correctly the individual to be exposed to ionising radiation"[1,2]. There is also a professional expectation that all procedures and associated medicines are accurately identified as appropriate to the individual receiving them, and that they are undertaken and administered at the right time[6].

The Care Quality Commission (CQC) annual IR(ME)R reports[7] highlight, over several years, a recurring theme of errors that meet the criteria for notification to them as the IR(ME)R regulator for England. Despite the presence of national and international guidelines, and organisational level governance through local policies and procedures, the CQC reports show low prevalence, but persisting patient identification incidents.

Identification incidents represent a varying proportion of the notifiable incidents submitted to UK regulators each year (Table 2.1 and Table 2.2). The impact on individuals not receiving the care intended for them, or receiving the wrong, or delayed care, can be significant and long lasting. Trends in the UK regulators' data suggest these incidents occur with some consistency.

The Society of Radiographers (SoR) has worked with the four UK IR(ME)R regulators (Appendix 3), the UK Health Security Agency (UKHSA), and representatives from SoR advisory groups (Appendix 1) to produce this guidance and support services in evaluating how to prevent identification incidents. In this guidance, notifiable Significant Accidental and Unintended Exposures (SAUE) data relating to identification incidents has been examined; from this, common causes and contributory factors for these incidents have been determined and the findings have been used to develop recommended strategies that focus on learning from these incidents and, more importantly, on preventing them.

Combined data from across the UK is presented by the IR(ME)R regulators. The data, which include diagnostic, nuclear medicine and radiotherapy incidents, demonstrate a low prevalence of patient identification errors and identify the root causes as a combination of failure to follow procedure, and slips and lapses, rather than a lack of guidance or employers' procedures.

This guidance recommends tools to prevent risk of harm caused by patient misidentification. It considers the use of existing national and professional body guidance, local governance processes and written procedures, and examines the causes and factors contributing to patient identification incidents. It demonstrates common error categories (root causes and contributory factors). The guidance acknowledges that safe practice cannot be achieved solely by enforcing procedures from the top down, but instead requires investment in the people who deliver critical tasks and their involvement as experts in the development of operational procedures. It examines the existing support structures and human factors that enable patients to be positively identified in the majority of cases. Recommendations are made to highlight where resources might be directed in order to further reduce the risk of harm to patients. These recommendations focus on the impact of attitudes and behaviours and consider opportunities to adopt core principles and behaviours to mitigate risk of error, improve practice and further reduce the risk of harm to patients.

These guiding principles are based on the legal requirement to protect individuals from the harmful effects of ionising radiation, but their application might also protect people from delays or misdiagnosis due to incorrect procedures or data mis-labelling. For this reason, the principles might be equally applied to procedures where no ionising radiation is used, such as Magnetic Resonance Imaging (MRI) or Ultrasound (US) and should be similarly reflected in those standard operating procedures.

Glossary of terms

Clinical Imaging Board	The Royal College of Radiologists (RCR) Society of Radiographers (SoR) College of Radiographers (CoR) Institute of Physics and Engineering in Medicine (IPEM)
CBCT	Cone beam computed tomography
CT	Computed tomography
Datix	Web-based incident reporting and risk management software
ID	Identification
Incident	Error or near miss event
MRI	Magnetic Resonance Imaging
PSRT	Patient Safety in Radiotherapy Steering Group
PHE	Public Health England (now UKHSA)
Radiotherapy Board	The Royal College of Radiologists (RCR) Society of Radiographers (SoR) College of Radiographers (CoR) Institute of Physics and Engineering in Medicine (IPEM)
Regulator	Inspectorate or enforcing authority
RIS	Radiology Information System
RTE	Radiotherapy errors and near misses
UKHSA	UK Health Security Agency (previously PHE)
US	Ultrasound

Introduction

The CQC defines patient identification incidents as either **accidental**:

> an individual has received an exposure in error, when no exposure of any kind was intended[8]

Or **unintended**:

> although the exposure of an individual was intended, the exposure they received was significantly greater or different to that intended[8]. For example, in the dose received, there may have been an error in either the modality or technique, patient anatomy exposed, radiopharmaceutical prescribed or administered, timing of exposure or the functionality of the equipment. An unintended exposure may also happen as a result of non-diagnostic images where the patient needs to be recalled for repeat imaging, whether caused by procedural, systematic or human error[8].

For clarity, all patient identification incidents will be referred to jointly as 'accidental or unintended'.

The IR(ME)R regulators for England, Wales, Northern Ireland, and Scotland (Appendix 3) require employers to notify them of significant accidental and unintended exposures. The criteria for notifying regulators vary across the four countries. In Northern Ireland, Scotland and Wales, accidental exposures (as defined by the CQC) require notification to the regulators regardless of dose. This is a requirement for all ionising radiation services, including radiotherapy. In England there are threshold levels of effective dose before these become notifiable[8]. In all cases, patient identification incidents should be investigated at a local level, fulfilling the requirements of IR(ME) R Regulation 8(4). A preliminary investigation of the incident must be carried out and unless this shows beyond reasonable doubt that no accidental or unintended exposure occurred, a detailed investigation must follow. Guidance on the investigation[9] and reporting of incidents is available for employers and duty holders[10].

UK radiotherapy providers are required to notify the IR(ME)R regulators of all SAUE or 'reportable radiation incidents' (level 1), as defined in *Towards Safer Radiotherapy*[11]. In addition, all types of misidentification and near-miss events can be submitted for inclusion in national analysis and the *Safer Radiotherapy* publication series[12]. In England and Wales, this is currently done through the National Reporting and Learning System (NRLS) at NHS England and NHS Improvement. In Northern Ireland and Scotland, radiotherapy incidents are reported directly to the UK Health Security Agency (UKHSA, formerly Public Health England (PHE))[10]. This guidance examines collective data from 1 January 2019 to 31 December 2020 across England, Northern Ireland, Scotland and Wales.

A patient identification incident can be defined as when:

- an individual receives a procedure where none was intended
- an individual receives the wrong procedure, due to either being referred incorrectly or being incorrectly identified on attendance
- the wrong individual is referred for diagnostic imaging, medicine*[1] , interventional procedure or radiotherapy
- the wrong individual receives diagnostic imaging, medicine*[1], interventional procedure or radiotherapy
- an individual receives the wrong diagnostic imaging, medicine*[1] or interventional procedure
- an individual receives the wrong radiotherapy planning, verification or treatment exposure
- an individual receives the right diagnostic imaging, medicine*[1], interventional procedure or radiotherapy at the wrong time due to misidentification
- an individual receives the right diagnostic imaging, medicine*[1], interventional procedure or radiotherapy but a data labelling error, where a second individual is incorrectly identified, impacts the subsequent care of one or both individuals

A patient identification near miss can be defined as when:

- an error is identified before the examination or procedure begins

For examinations and procedures not involving ionising radiation there should be a local policy for recording and investigating incidents. Where errors or near misses are identified, measures should be in place to disseminate learning and implement risk-prevention strategies.

[1]In this context ***medicine*** means any pharmacological product used as part of the diagnostic investigation or therapeutic procedure, e.g. oral, parenteral or intravenous contrast agent or radiopharmaceutical.

Establishment and aim of the working party

Following discussions with the CQC, the SoR agreed to establish a working party to assess patient identification incidents in UK diagnostic imaging, nuclear medicine and radiotherapy services and make recommendations for improvements. The three devolved administration IR(ME)R regulators were invited to join and all accepted. Recognising the enormous contribution that the UKHSA radiotherapy data set makes to ongoing learning from errors, a representative of the Patient Safety in Radiotherapy Steering Group was invited to contribute. Two representatives joined the working party from SoR membership through the Diagnostic Imaging Advisory Group and the Radiation Protection forum; a lay representative joined from the College of Radiographers Patient Advisory Group. Three SoR professional officers representing diagnostic and therapeutic radiography and an SoR regional officer completed the group of twelve members (Appendix 1). The working party, led by one of the SoR professional officers, commenced their work in January 2021 when terms of reference were agreed (Appendix 2). The group met via online video conferencing software. Members also had their own online workspace on the SoR Synapse intranet platform.

Background

It is a requirement of IR(ME)R (Schedule 2: Employer's Procedures, 1(a)) "to identify correctly the individual to be exposed to ionising radiation"[1,2].

Similarly, there is a professional expectation that all procedures and associated medicines are accurately identified as appropriate to the individual and that they are undertaken at the right time. This should be reflected in procedures where ionising radiation is not involved, such as MRI or ultrasound.

The Health and Care Professions Council (HCPC) Standards of conduct performance and ethics[13] require that all of its registrants, including diagnostic and therapeutic radiographers, **MUST**:

- take all reasonable steps to reduce the risk of harm to service users, carers and colleagues as far as possible
- not do anything, or allow someone else to do anything, which could put the health or safety of a service user, carer or colleague at unacceptable risk

This also applies when supervising trainees and students where the radiographer retains responsibility for the episode of care.

The Diagnostic Imaging Dataset (2019–20 data) reported that 44.9 million imaging tests were performed in England during this period[4]. Until the arrival of the COVID-19 pandemic, this figure had been growing year on year; the annual figure fell to 34.8 million in the twelve months from February 2020 to January 2021, due to large-scale postponement of non-acute procedures. A similar fall in radiotherapy attendances was seen during the early COVID-19 response because of delays in patient presentation, diagnosis and referral for radiotherapy. However, this was also influenced by an evidenced step change in fractionation regimes, which meant a large cohort of patients had their treatment prescription delivered with fewer attendances to radiotherapy departments. Attendance figures for NHS radiotherapy providers in England and Wales fell from 1,980,061 in 2019 to 1,449,702 in 2020.

Considering the number of people accessing imaging tests and treatment, the number of individuals receiving a procedure where none was intended or receiving the wrong procedure is extremely low[14].

The SoR and the CoR believe that the patient voice should be at the heart of decision making in radiography education, service design, service delivery and research[15]. Fundamental to this principle is ensuring the right patient receives the right examination or treatment at the right time. The Clinical Imaging Board publication *Patient Identification: guidance and advice*[16], revised in June 2019, makes twelve recommendations for local procedures to ensure accurate identification of every patient. There is similar guidance for medical ultrasound[17] and MRI[18].

As far back as 2009, healthcare professionals were being alerted to the risk of misidentification with the now archived National Patient Safety Agency alert *Risk to patient safety of not using the NHS Number as the national identifier for all patients*[19]. In response to the challenges faced by emergency departments delivering care to unconscious patients, or to those unwilling or unable to confirm their identity due to lack of capacity, NHS Improvement issued a Patient Safety Alert in 2018: *Safer temporary identification criteria for unknown or unidentified patients*[20].

Sidney Dekker is Professor and Director of the Safety Science Innovation Lab at Griffith University in Brisbane, Australia, and Professor at the Faculty of Aerospace Engineering at Delft University in the Netherlands[21]. In *Safety Differently – The Movie*[22], Dekker effectively illustrates, through case studies, that safety is not achieved by imposing procedures from the top down but by investing in the people that deliver the safety critical tasks on a daily basis and giving them control over the development of safety procedures at an operational level.

Hollnagel[23] defines safety from two perspectives: Safety I and Safety II. Safety I is described as a state where there are few incidents but when things do go wrong, they are investigated

by analysing causes and contributory factors. The triggers for failure are attributed either to a technical process or procedure or to human factors, with the latter being the most likely as human behaviour is most variable. Safety I is largely a retrospective process although learning can be applied proactively to prevent future incidents. In contrast to this, Safety II depicts a state ensuring as many things as possible go right. It is acknowledged that most of the time things do go right in healthcare despite changing environments, variations in human behaviour (staff and patients) and the challenges of change. This is achieved through training, education and practical experience. In Safety II, the reason why things go right so often is credited to a human ability to adapt to situations and respond effectively. It could be argued that this is particularly relevant in healthcare where situations can change rapidly and complex decisions are made at speed. Hollnagel considers that if there is a focus on what is done well when working effectively, there is investment in both safety and productivity while remaining alert to the possibility of failure.

In 2019 NHS England and NHS Improvement launched *The NHS Patient Safety Strategy*[24], laying down a vision for continuous improvement in patient safety through a commitment to reduce harm. Drawing on *From Safety-I to Safety-II: A White Paper*[23], it considers how the concepts of Safety II will be applied to clinical practice. The strategy stresses the need for practitioners to have a constantly enquiring mind, to notice when things go right, to be alert to the possibility of something going wrong and to recognise when something has gone wrong. It recognises the high level of existing governance and legislation in healthcare and focusses attention on safety systems and safety culture. This is reflected in the *Report of the Independent Inquiry into the Issues raised by Paterson*[25], which acknowledges that the healthcare system is not lacking regulation and that safe practice requires more than individuals doing their best. Shared values and intentions, effective leadership and clear communication pathways underpin an effective safety culture. The Patient Safety Strategy requires all NHS organisations in England to appoint a designated Patient Safety Specialist. The intention being for all NHS employees to receive enhanced patient safety training. The associated *National Patient Safety Syllabus*[26] includes a domain on human factors, human performance and safety management, and a domain on creating safe systems.

In the report *Opening the door to change: NHS safety culture and the need for transformation*[27] the CQC defines 'Never Events' as "serious incidents that are considered to be wholly preventable because guidance or safety recommendations that provide strong systemic protective barriers are available at a national level, and should have been implemented by all healthcare providers". Patient identification incidents have the potential to increase the risk of a Never Event occurring; the report recommends "exploring the barriers to preventing error such as human behaviour". The NHS policy on Never Events[28] explains what they are and how to manage them.

By contrast, 'Always Events' are defined by the Institute for Healthcare Improvement for NHS England as "aspects of the patient experience that are so important to patients and family members that health care providers must aim to perform them consistently for every individual, every time"[29]. For patients, receiving the right care at the right time is essential. During development of the *Patient Public and Practitioner Partnerships within Imaging and Radiotherapy: Guiding Principles*[15], patients set down their core values and expectations for undergoing diagnostic imaging or radiotherapy. Of the many standout statements, one is of particular significance to this guidance.

> It may not matter to me that you are a radiographer rather than a nurse, but I need to know that you are skilled at what you do, that the equipment you use is up to the job, and that I can have complete confidence and feel safe in your care. Show me that you know what you are doing and that I can trust you.
>
> Steven La Pensee, 2018

Radiographers and other healthcare professionals should be confident beyond any doubt that they are performing the right test on the right patient at the right time. Patients, their carers and families should be empowered to seek reassurance if asked to attend any imaging or treatment they are not expecting, or for which adequate explanation has not been given, or the opportunity to ask questions has not been provided. This should be made clear in the information provided to patients and service users.

The Healthcare Safety Investigation Branch (HSIB) launched a national investigation after reviewing the NHS national reporting systems, which provided evidence that incorrect identification of patients is a contributory factor to patients receiving the wrong procedure. In June 2021 the HSIB published the report *Wrong site surgery – wrong patient: invasive procedures in outpatient settings*[30] and recommended that NHS England and NHS Improvement "leads a review of risks relating to patient identification in outpatient settings, working with partners to engage clinical and human factors expertise". The SoR supports the recommendation and believes that leaders of radiology services should review their written procedures for correctly identifying individuals to be exposed to ionising radiation; in doing so, they should consider the systematic controls and human factors associated with the practical application of the procedure. In effect: check that the procedure and the practice are aligned.

The World Health Organisation Collaborating Centre for Patient Safety Solutions produced a statement covering the problems associated with failure to correctly identify a patient and highlighted the impact of a range of resulting incidents[31]. The statement recommends processes

to address physical identification methods, individual responsibility, and standardisation across organisations. The World Health Organization (WHO) recognises a large number of potential barriers to safe practice, including the opportunity for error during patient handovers[32]; many of these barriers are reflected in Table 1.1.

Error reporting

In June 2019 the CQC redefined the criteria for statutory notification of radiation incidents. The newly defined 'significant accidental and unintended exposures' (SAUE) reduced the number of very low risk notifications reported in England.

The CQC publish IR(ME)R reports that demonstrate ongoing notifiable ionising radiation incidents involving incorrect patient identification[7]. The *IR(ME)R annual report 2019/20*[33] reflected a shorter reporting period from 3 June 2019 to 31 March 2020. Acknowledging the new definition for notifiable incidents and the effects of the COVID-19 pandemic, the report demonstrated that the most common type of error continues to be when the wrong patient receives an exposure, with 28% of all diagnostic imaging incidents resulting from referral of the wrong patient. Whilst this had fallen from the previous year, the percentage attributed to referrer error had risen from 35% to 42% of the total, and incidents attributed to operator error fell from 16% to 6%. This echoes the findings of previous annual reports; in 2018/19 the wrong patient receiving an exposure was, again, the most common type of error with 50% of all diagnostic imaging incidents resulting from referrers failing to refer the right patient, or operators failing to correctly identify patients[14]. In 2017/18 the number of incidents accounted for by referrers requesting examinations of the wrong patient had risen slightly compared to the previous year[34].

28% of all diagnostic imaging incidents result from referrers failing to refer the right patient

The Healthcare Inspectorate Wales *Annual Report Ionising Radiation (Medical Exposures) Regulations (IR(ME)R) 2017-2018*[35] demonstrated variation in the number of notifications received across services. The main reason for patients receiving unnecessary exposures was patient identification incidents.

First published in 2008, *Towards Safer Radiotherapy*[11] (TSR) was seminal work in the reporting and analysis of incidents in radiotherapy. It acknowledged that while there are risks associated with human error in any medical procedure, the data demonstrated unintended exposure risks to be relatively low in radiotherapy. More recently the *Biennial radiotherapy error* (RTE) *data analysis and learning report: January 2018 to December 2019*[36], which contains data from the UK IR(ME) R regulators, estimates an error rate of 0.4 per 1,000 prescriptions due to reportable radiation

incidents (level 1 events) with the majority of these events having no impact on patients' planning, treatment or outcomes. This is considerably lower than for diagnostic imaging. The root causes of incidents most frequently reported were non-adherence to protocols/procedures and individual slips and lapses. As a result, the review of referral guidelines and procedures was recommended to ensure that all required primary source diagnostic information containing patient identifiers is in place prior to justification and authorisation of treatment. *TSR* states "correct patient identification is essential at every step. Procedures eliciting an active response from the patient must be used. The use of new technology to assist patient identification should be explored"[11].

Radiotherapy error data collected and analysed by UKHSA reflect similar trends in patient identification incidents[36].

The Clinical Imaging Board (CIB) has published a toolkit to aid learning from ionising radiation dose errors, adverse events and near misses in UK clinical imaging departments. This was revised in 2024[37,38].

Incident reporting and safety cultures

In addition to regulatory requirements, the SoR promotes healthy, no blame reporting cultures. Robust incident reporting procedures, operating within a just and learning culture[39] are considered fundamental to safe practice. Healthcare professionals need to feel safe to admit mistakes and be confident in the investigation and reporting process in order to share opportunities for learning. The SoR recognises that managers and senior staff play a key role in creating these working environments by committing to investigate and understand the incident rather than emphasising the fault of the person who made the mistake. In doing so they can reinforce accountability in all members of the team. Personal accountability, which includes recognising and owning mistakes, not blaming others, and a desire to reflect and learn from mistakes is the cornerstone of a healthy reporting culture[40]. It can also help to develop personal resilience.

Healthcare professionals should know when to inform the patient of an incident. They should also understand when an incident is notifiable under Duty of Candour legislation[41].

Existing guidelines, principles, policies and procedures

Professional practice in diagnostic imaging, nuclear medicine and radiotherapy can be considered to follow a hierarchy of control measures to ensure lawful, safe and evidence-based practice. These are:

- Regulatory requirements (what the law requires) – these must be followed
- Registrant (HCPC) responsibilities across the four countries (minimum standards) – these should be followed to maintain registration
- Employers' written procedures (what an employer states) – these must be followed unless there is a reasoned decision not to
- Professional body standards (attitude, behaviour and conduct expected of healthcare professionals and the evidence base for the profession) – these should be followed unless there is a reasoned decision not to

Radiographers will be familiar with their legal responsibilities and the regulatory requirements of IR(ME)R to correctly identify the individual to be exposed to ionising radiation. They will be working in accordance with employers' written procedures, which should clearly define the actions to be taken including any variations to standard practice. Local written procedures are likely to reference a number of professional body publications.

A number of resources promote safe practice for the correct identification of a patient prior to the delivery of care. Beginning in 2015 the CIB produced a series of *Patient Identification: guidance and advice statements*[16-18] and in 2020, The Royal College of Radiologists published *IR(ME)R: Implications for clinical practice in diagnostic imaging, interventional radiology and diagnostic nuclear medicine*[42]. This joint professional body guidance contains a chapter on identification of the individual to be exposed (chapter 12). Similarly, in June 2020 the Radiotherapy Board published *Ionising Radiation (Medical Exposure) Regulations: Implications for clinical practice in radiotherapy*[43] with comparable recommendations on identification of the individual to be exposed.

In 2010, in response to queries about the roles of pre- or non-registered staff, the SoR published *Student radiographers and trainee assistant practitioners: verifying patient identification and seeking consent*[44].

Common expectations across the guidance are that:

- accurate identification always starts with the referring clinician (the referring clinician provides the primary source data, which will be used to correctly identify the patient and their procedure thereafter)
- radiographers use a positive enquiry, requiring an active response from the patient, or positive verification against an identity band if the patient is unable to communicate, e.g. name, date of birth, address, etc.
- a minimum of three questions are asked (first name and surname, date of birth, address or unique identifier, e.g. NHS or equivalent number)
- there is a written procedure to follow to accurately determine the patient's identity where verbal communication is not possible
- there is a written procedure to follow when the patient cannot be identified (e.g. unknown, unconscious, lacking capacity)
- there is a written procedure to follow when positive identification cannot be made or if there is doubt as to the validity of the referral information (e.g. wrong date of birth, wrong address)

Accurate identification of a patient requires robust policies and procedures and should be rooted in technology throughout the patient care pathway. Patient information systems can be employed to store, process and share patient data using unique identifiers. One example of this is the use of barcodes on identity bands. NHS Digital use the information standards DCB1077: AIDC for Patient Identification and ISB 0099: Patient Identifiers for Identity Bands[45], which specify four core identifiers that must be included on an NHS identity band. These are:

- Last name
- First name
- Date of birth
- Verified NHS number

In Scotland, there is a requirement to use the Community Health Index (CHI) number[46].

In Wales, there is a requirement to use the unique identifier issued to every individual registered with the NHS in England and Wales[46,47].

In Northern Ireland, the unique identifier is the Health and Care Number (H&C Number)[48].

Using identity bands designed in line with these standards reduces the risk of misidentification of a patient.

The SoR expects the radiographic workforce to work in line with employers' procedures as well as UK and worldwide guidance and standards[31,49]. The SoR has published a series of 'PAUSED and checked' posters to help referrers note the information required when referring a patient and to help the radiographic workforce verify this information across a wide range of imaging techniques. These can be freely downloaded from the SoR document library and used widely across organisations where healthcare professionals are referring people for diagnostic imaging, nuclear medicine, or radiotherapy.

It could be argued that the drivers for service improvement are more complex than following or not following a local procedure. Where there is reasonable chance of predicting that a patient identification incident might occur, a prior risk assessment could be used to identify measures to mitigate this.

The SoR believes the safety of patients in practice depends upon the people that deliver care. Written procedures and safety systems should reflect what is done in practice, taking into account human interactions, experience and autonomous decision making.

Software and hardware limitations

Healthcare software systems use many different patient identifiers. Different terms may be used during patient pathways through medical imaging and radiotherapy and across industry vendors. Access to appropriate hardware, such as a computer terminal, at the point of entering or checking the primary source data may not always be readily available. As a result, there will be variations in some management processes, policies and procedures. Accurate representation of unique patient identifiers, such as full name, NHS number (or equivalent), date of birth, address and data set (e.g. patient plan or CT planning data set), is an example of where there may be variations in data collection and recording. This adds to the challenge of ensuring a standard or systems approach to preventing misidentification errors.

With the growth of digital systems used in healthcare, easy access to primary source data within software systems is imperative to enable operators to correctly identify the patient and their personal data. Where multiple systems are in place, efforts should be made to reduce the need for transcription of patient identifiers between systems. Critical checks should be made on the integrity of data transfer between systems used to correctly identify the patient and their personal data.

Data collection and results

Many low-level accidental or unintended exposures are no longer notifiable to the UK regulators of IR(ME)R. Nevertheless, it is helpful to understand the range of incidents occurring at low dose levels and compare these to recorded data from SAUE cases (notified to the regulators) to ensure that commonalities and variances are captured.

Evidence for this guidance was collected in two stages.

During stage 1, the SoR held a series of ad-hoc listening events for accredited SoR Trade Union and Industrial Relations Representatives (Reps). The SoR Reps network consists of radiographers and student radiographers who are trained to represent SoR members' interests to their employers. A call went out to all Reps via email inviting them to join online sessions to discuss the practical challenges in busy diagnostic imaging, nuclear medicine and radiotherapy departments, and to identify common themes from local reporting of patient misidentification incidents. Four Reps volunteered, representing four different Health Trusts/Boards. Conversations revealed encouraging reporting cultures, although the opportunity to receive feedback and learn from incidents varied. Some Reps described implementing quality improvement measures as a key part of their reporting procedure, recognising that a robust learning culture can help reduce patient misidentification incidents. Others reported little or no feedback from incident reporting. The key themes that emerged are presented in Table 1.1 and Table 1.2.

Stage 2 involved analysis of individual country data provided by the UK IR(ME)R regulators.

Incidents notified to all four UK regulators between 1 January 2019 and 31 December 2020 were combined; diagnostic imaging and nuclear medicine data for the UK are presented in Table 2.1 and radiotherapy data in Table 2.2. Radiotherapy data were further analysed to determine the number and severity of Radiotherapy Error (RTE) reports by year (Table 3), where errors occurred within the radiotherapy pathway (Figure 1 and Figure 2), and the reported cause or contributory factors for these errors (Table 4).

The reporting period was agreed as two years to ensure incidents were captured both before and during the COVID-19 pandemic. It is acknowledged that reporting volume may have fluctuated

during the pandemic and that the wearing of masks by healthcare staff and patients may have resulted in increased communication challenges during this time, which may have impacted on misidentification incidents. It is also acknowledged that the CQC redefined the criteria for statutory notification of radiation incidents in mid-2019. The stage 2 data therefore represent a snapshot in time. The number of incidents contributed by the CQC are much greater than those from the other regulators due to the greater number of organisations it regulates.

Results

Stage 1

Reps shared their working experience and anecdotal evidence of how work carried out compared with work as intended according to local policy within their workplaces. Four Reps volunteered to provide examples of the types of Datix incidents from their local perspectives (Table 1.1). The points made here are representative of general incidents and do not reflect individual errors. In addition to this, the Reps shared their observations of other potential causes or contributory factors for error (Table 1.2). These points might not have been specifically recorded in any local incident reports, but they were recognised as having the potential to increase the likelihood of errors happening.

Table 1.1 Examples of general patient misidentification incidents

Root cause or contributory factor	Learning or service improvement made
Referrer used wrong patient label or incorrect written patient demographics	Audit results fed back to referrers
Nurse escort is unfamiliar with the patient and is unable to correctly identify them	Ensure all staff are aware of the organisational procedure for identification of a patient at every handover of care
Porters directed to/collected wrong patient from the ward	Training for support staff and procedures in place to verify the patient's identity
Imaging support worker incorrectly identified the patient on arrival in the department and the patient's identity was subsequently not checked by the operator	Training for support staff and radiographers, awareness of procedures, reminder of radiographers' legal responsibilities as operators under IR(ME)R
Bank/locum radiographer failed to follow correct procedure leading to incorrect patient sent for from the ward	Adequate training in local policies procedures and attitudes for all bank/agency/locum/ temporary staff
Patient unable to communicate due to language barrier, no wristband or interpreter unavailable	Review of procedures for: • patient identification • patients leaving the ward unaccompanied • communication and consent
Confusion due to different patient identification procedures within the same department/hospital	Ensure consistent standards for patient identification

Table 1.2. Observations of other potential causes or contributory factors for errors

Observations	Suggested learning or service improvements
Staff moving jobs noticed increase/decrease in paperwork from site to site	All new staff to read the patient identification policy and follow the SoR paused and checked procedure[50]
Inconsistent procedures between areas at the same site	Radiology service managers to work together to ensure standardisation where achievable Use of Practice Educators and SoR Learning Reps to disseminate learning
In some sites multiple staff may be involved in a patient pathway compared to one person at another site	Ensure procedure for effective identification of roles and responsibilities where multiple staff are involved. Clarify lines of accountability, methods of communication and handover procedures
Working practices noted to be more relaxed in plain film imaging where there was likely to be a single point of contact with the patient compared to CT where there may be multiple staff involved	Ensure consistent standards are being met for every patient
Delay in moving to electronic referral systems and continued use of paper and manual data entry was felt to have increased the likelihood of error	Priority should be given to move towards electronic data sharing systems where a common standard applies
Error reporting and analysis discussed at local clinical governance meetings and routinely fed back to staff for learning	Monthly newsletter to highlight opportunities for learning Practical case studies worked through as a team Reflected in individual CPD records

Staff were encouraged to report near misses and errors but were given no feedback. This did not seem to affect their willingness to report	Acknowledge report and feedback learning points to all staff who report incidents as a matter of course
Support staff involved in many procedures. Patient identification performed by them rather than the IR(ME)R operator. A system of trust employed that it is the correct patient	Refer staff to their responsibilities as an operator under IR(ME)R Ensure procedures reflect safe practice
More relaxed approach to procedures and systems of work during very busy times	Acknowledgement that this may lead to slips and lapses at times Awareness of the increased need for safe practice during busier periods
Demoralised people gradually accepting declining working conditions, inaction, lack of inclination to change	Training around the impact of inaction and reminding staff of their professional responsibilities to reduce risk of harm
Several wrong patients being referred over a short period	Include a procedure to notify the referrer of the error and to identify learning opportunities for referrers who repeatedly refer inappropriately Include a statement in written procedures, for example: All IR(ME)R Operators must check imaging and clinical or radiology report history against the clinical information on the request and investigate any inconsistencies

The SoR Reps also described how good practice is demonstrated within their workplaces:

- All reported open and honest cultures where all staff know how to fill in an incident report. They described more near misses documented than actual errors.
- Feedback is generally good from error reporting but could be improved in some sites.
- New staff have to read the patient identification policy and use the SoR paused and checked[50] process.
- Incidents are discussed at clinical governance meetings.
- Learning from incidents is shared via a monthly newsletter.
- Practice Educators and SoR Learning Representatives play an active role in disseminating learning.
- Audit of incident report data is part of a local audit programme.
- Primary source data is available and checked at the point of identifying the patient.

Stage 2

Tables 2.1 and 2.2 present total incidents and patient ID incidents notified to regulators across the UK between 1 January 2019 and 31 December 2020. Combined diagnostic imaging and nuclear medicine data for the UK are presented in Table 2.1 and combined radiotherapy data in Table 2.2.

Table 2.1 Total and patient ID incidents in diagnostic imaging and nuclear medicine

UK IR(ME)R regulators data	Total Incidents	Patient ID Incidents	Patient ID incidents as a percentage of total incidents
UK (all four countries combined)	1,256	210	16.7

Table 2.2 Total and patient ID incidents in radiotherapy

UKHSA (PHE) data	Total Incidents	Patient ID Incidents	Patient ID incidents as a percentage of total incidents
UK (all four countries combined)	18,021	223	1.23

From the data in Tables 2.1 and 2.2, it is noted that the number of patient identification incidents as a percentage of total incidents is greater in diagnostic imaging and nuclear medicine than in radiotherapy.

Diagnostic imaging and nuclear medicine data

Of the patient identification incidents notified to the IR(ME)R regulators, most involved the wrong patient being brought to radiology from the ward and were due to nursing and escort staff and/or porters failing to identify the correct patient. Root causes or contributory factors for these incidents include:

- patients with similar names and dates of birth
- wrong patient answering to a called name
- no identity band (mostly from the emergency department or pre-admission clinics)
- patient unable to provide positive identification themselves and not wearing an identity band
- nurse/escort confirming identification incorrectly
- multiple operators with one presuming another has carried out positive identification
- failure to match verbal response from the patient to the information on the request/system – resulting in incorrect selection
- paperless referral with no screen available to cross-reference patient's response
- asking 'Is your name…?' rather than open question techniques, such as 'what is your name?'
- patients identified using notes/porters slips/questionnaires (correct notes but wrong patient)
- scanning the request form into the wrong patient record on the Radiology Information System (RIS)

Radiotherapy data

Due to established incident reporting and data analysis procedures operating in radiotherapy, the data provided for these incidents allowed for a more detailed review.

Therefore, the radiotherapy data presented in Table 2.2 can be further interrogated to show the number of Radiotherapy Error (RTE) reports by year and by severity (Table 3), the radiotherapy pathway codes (Figure 1) and sub-codes (Figure 2) indicating where the errors occurred within each pathway, and the reported cause or contributory factor for each incident (Table 4).

RTE severity classifications[11] are indicated as:

Level 1 – Reportable radiation incident (significant accidental or unintended exposure)

E.g. A patient attends for radiotherapy. The oncology management system has been left loaded with a different patient's details. This was not checked before 'beam on', resulting in the patient receiving the incorrect patient partial treatment.

Level 2 – Non reportable radiation incident

E.g. At treatment, details for patient 1 are uploaded onto the treatment console and details for patient 2 are uploaded onto the verification imaging console. Imaging occurs before the discrepancy is noticed.

Level 3 – Minor radiation incident

E.g. A Cone Beam CT (CBCT) is acquired under the incorrect patient details, therefore an additional exposure is required.

Level 4 – Near miss

E.g. A patient is seen in clinic and palliative radiotherapy is requested. The booking form is completed for the wrong patient. Planning radiographers identify the error prior to the CT scan.

Level 5 – Other non-conformance

E.g. The incorrect ID photo is attached to the patient record at CT. The error is identified prior to first treatment following the first day chat.

Table 3. Radiotherapy Error (RTE) reports by year and severity

Year	Level 1 RTE	Level 2 RTE	Level 3 RTE	Level 4 RTE	Level 5 RTE	Total ID RTE	Total RTE	ID RTE as a % of total RTE
2019	6	1	31	47	46	131	10139	1.29
2020	6	1	15	22	48	92	7882	1.17
Grand total	12	2	46	69	94	223	18021	1.23

Of the Radiotherapy Error (RTE) reports recorded between 1 January 2019 and 31 December 2020, twelve were notifiable to the relevant IR(ME)R regulators as significant accidental or unintended exposures. These are presented as Level 1 RTE in Table 3.

Figure1. Number of RTE reports by radiotherapy pathway code 2019–2020

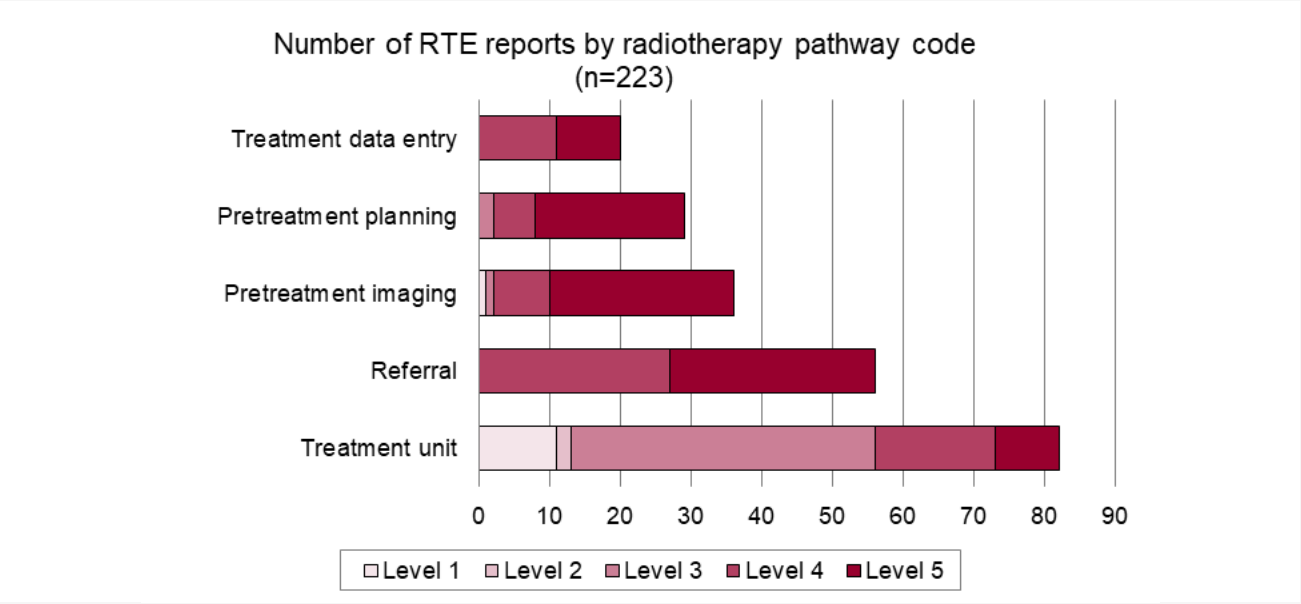

Figure 2. Number of RTE reports by radiotherapy pathway sub-code 2019–2020

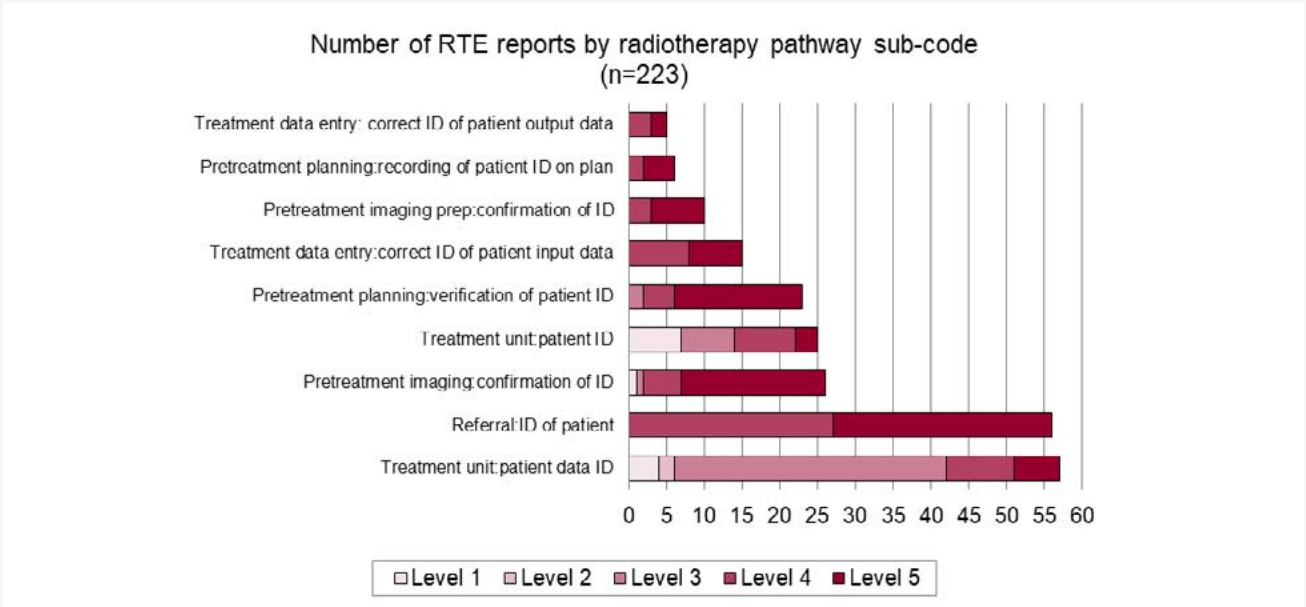

Table 4. Reported root cause or contributory factor for each RTE

Reported root cause or contributory factor for RTE	Number of RTE reports
Slips and lapses	115
Adherence to procedures / protocols	46
Communication	37
Failure to recognise hazard	14
Decision making process	3
Communication with the patient	3
No procedures / protocols	1
Inadequate procedures / protocols	1
Equipment or IT network failure	1
Inadequate staffing	1
Other	1
Grand Total	223

Impact of patient identification incidents

Impact on the patient

The impact on the patient of having the wrong test or wrong radiation dose may vary from mild anxiety to significant distress or fear of harm, especially if the patient is pregnant, young or has had many previous examinations. The patient is also likely to be concerned about any adverse effect on their outcome or prognosis caused by a delay. In some circumstances, harm caused by having the wrong test may be irreversible. It is recommended that a risk assessment is performed for each imaging pathway to assess the potential impact of imaging or treating the wrong patient.

Impact on the healthcare provider

Healthcare professionals do not set out to cause harm to patients and it is a requirement of the *Standards of conduct, performance and ethics*[13] for all registered Allied Healthcare Professionals to take all reasonable steps to reduce risk of harm. The General Medical Council states in *Good medical practice*[51] that doctors should make the care of the patient their first concern. It can be very distressing for any healthcare worker to realise they have caused harm to a patient, either through their own actions or inactions. They may be afraid of the outcome for the patient and of repercussions for themselves and their job. They may experience negative emotional and behavioural responses, which in some cases may be long lasting.

Managers should be alert to the impact on employees following a serious patient identification error. However, behavioural responses may be positive. Bari's study[52] of post-graduate paediatric medical residents found that following an incident, the persons involved became more careful, increased how often they sought advice from senior staff and started paying more attention to details. It is important that positive reporting and learning cultures are established not only to prevent future incidents but to maximise the positive impacts on behaviours. Effective leadership, trust and teamwork play important roles in setting the scene for positive reporting cultures and in creating the cultures of psychological safety referred to in *The NHS Patient Safety Strategy*[24].

In 2020 Riplinger et al. found that patient misidentification incidents in the United States resulted in challenges with recovering accurate costs for healthcare and limitations with data sharing[53]. These outcomes can lead to upset, frustration and anxiety for the patient and delays and inefficiencies for the healthcare provider.

> The incorrect identification of a patient at any point in their care pathway can initiate a series of inappropriate decisions or delays and can lead to harm.

Impact of not addressing the causes of repeat incidents

It is not fully understood why patient identification incidents still occur, but the potential for harm each time a person receives the wrong diagnostic imaging or nuclear medicine examination, radiotherapy or medication is clear. The impact of not addressing the causes of repeat incidents might include but are not limited to:

- Ongoing risk to patients
- Risks to the second patient (indirect risks) for example:
  - » a patient's radiotherapy treatment plan is used to treat another patient due to an ID error
  - » a patient undergoes an intervention not intended for them or at the wrong time in their care pathway due to use of the wrong medical record
  - » the wrong vial is used in nuclear medicine and the second patient may not be able to receive their administration as planned
  - » an appointment is sent to the wrong person due to a referrer error and the correct patient fails to get a CT scan for several weeks
- Risks to staff – negative outcomes, emotional and behavioural responses, loss of job, loss of registration in extreme cases
- Cost to the organisation, for example, from ineffective procedures, poor training, patient complaints, delays, duplication of work, litigation

Impact of good practice

Establishing a well-led, open, honest, robust and safe culture of reporting and learning from misidentification incidents improves patient and staff safety. Making real-time accurate patient identification part of the regular audit cycle will embed good habits into normal behaviour. Developing robust procedures to alert medical and non-medical referrers to patient identification incidents and sharing the learning more widely will help to embed a minimum safe standard at organisational level. Ensuring staffing levels are appropriate for safe service delivery and that staff have appropriate rest breaks may help reduce slips and lapses caused by fatigue.

Patient and public education

Good quality patient information resources that clearly explain procedures and give patients and their carers the opportunity to ask questions, or to challenge something they feel is not quite right, will support safe practice in diagnostic imaging and radiotherapy. Patients should feel confident and safe in the care of healthcare professionals. Confidence can be gained by the effort and importance healthcare professionals place on getting it right first time.

Displaying patient information posters and including information in patient correspondence that explains how positive identification should be made may help empower people to speak up when this does not happen.

Discussion and recommendations

Patient identification incidents in diagnostic imaging and nuclear medicine are uncommon and are even less common in radiotherapy. There is a wealth of easily accessible guidance on how to develop safe and robust patient identification policies and procedures.

All NHS organisations in England should have an appointed Patient Safety Specialist and all employees should receive enhanced patient safety training.

It is recommended that local written procedures are reviewed to ensure that they align and that they reflect what happens in practice.

The UK IR(ME)R regulators report good compliance with the requirement of Schedule 2: Employer's Procedures, 1(a). Despite this, there is a year-on-year trend of patient identification incidents occurring in diagnostic imaging, nuclear medicine and radiotherapy across the UK. The IR(ME)R regulators report data show that the total number of incidents meeting criteria for notification are low. However, of the total incidents reported in diagnostic imaging and nuclear medicine, patient identification incidents represent quite a substantial percentage (Table 2.1). In radiotherapy this percentage is much lower (Table 2.2). Where it is possible to explore the data further, the impact of contributory factors (CF) is considered valuable. The evidence suggests that human factors such as slips and lapses, non-adherence to policies and procedures, and poor communication are the most common factors contributing to persistent patient identification incidents. Many of the reported CF are related to human factors: either not following professional body guidance and local procedures or not following them correctly.

Patient misidentification can occur at any point in the patient pathway or during any phase of medicines management, and many of the incidents evidenced by the data originate either with the referrer or with nursing or ancillary staff employed elsewhere. The National Institute for Health and Care Excellence (NICE) clinical guideline *Medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence*[54] states that good communication is needed between healthcare professionals to ensure patient care does not become fragmented. It could be argued that the three-point positive patient identification check is a longstanding tool and considered the baseline standard for all healthcare professionals, but the evidence suggests that not everyone is aware of or using this check as a minimum standard.

It is recommended that service leads in diagnostic imaging, nuclear medicine and radiotherapy seek to review their high-level organisational policies and ensure that a minimum safe standard for positive patient identification exists which is promulgated to all staff.

Earlier in this guidance patient identification incidents were defined as errors involving any diagnostic imaging, medicine, interventional procedure, or radiotherapy. While it is recognised that inappropriate administration of medicines can be caused by failure to correctly identify a patient, no incidents of this type were identified in the data. However, it is acknowledged that there is greater potential for harm where inappropriate administration of medicines occurs in conjunction with an error involving ionising radiation, than from an error involving ionising radiation alone.

> It is recommended that particular attention be given to the correct identification of patients who are to receive medicine as part of their diagnostic imaging, nuclear medicine or radiotherapy procedure.

The CIB guidance on patient identification[16] describes twelve check points to include in local procedures to optimise accurate identification of a patient. However, simply providing the written procedure is not enough. Employers should encourage staff to engage in the regular audit and critical review of procedures to assess their effectiveness. Involving the workforce, listening to feedback on what works well and what doesn't, and bringing procedures to life using quick-reference flow charts are all measures that may improve compliance.

National bodies can provide systems, policies and guidance for diagnostic imaging, nuclear medicine and radiotherapy services, but safety is improved at the point of care by the people delivering it. Service leaders must balance the needs of the service and ever-increasing demand against realistic service capacity and human capabilities. While professionals may strive to always function at maximum productivity and at the highest skill level, recognition of the propensity and contributory factors for slips and lapses is pivotal to a safe culture. The Health and Safety Executive

(HSE) describe human factors as individual, organisational and task related[55]. Understanding human failure types[56] can help in the investigation stage of an incident to identify why an error occurred and, importantly, how best to prevent it happening again. It is recommended that pre- and post-registration training and education around incidents and lessons learned from them should include the impact of human factors on routine practice. How we reflect and regard our own strengths and limitations and those of others is key to understanding why mistakes happen. Being aware of this does not mean distrusting colleagues or undermining another person's authority; instead, it means working with a proactive and enquiring (rather than assuming) attitude and being watchful for warning signs when information sources do not correlate[40].

It is widely accepted that minimising risk of harm is at the forefront of all registered healthcare professionals' thoughts, decisions and actions. For radiographers there is a requirement to take all reasonable steps to reduce the risk of harm to service users, carers and colleagues[13]. This means promoting safety-first behaviours and adopting processes that prioritise risk management. An effective and robust safety culture can reduce the number of incidents resulting in the harm or even death of patients from unintended exposures and administration of medicines in diagnostic imaging, nuclear medicine and radiotherapy[40].

It is recommended that all radiology service managers commit to a safety-first culture by promoting proactive and enquiring attitudes in all diagnostic imaging and radiotherapy services, and that they recognise the integral value of a governance, compliance and assurance framework.

The radiographic workforce is well accustomed to working under governance frameworks where the requirements of legislation, standards of registration (where applicable), employer's written procedures and the SoR Code of Professional Conduct[57] must all be met. The SoR recognises the challenges faced by the radiographic workforce to meet the ever-increasing demands of a fast-moving healthcare agenda. This has never been more apparent than during the COVID-19 pandemic where the pivotal importance of diagnostic imaging, nuclear medicine and radiotherapy services has been widely recognised.

Radiographers, nuclear medicine technologists and assistant practitioners have demonstrated their expertise and unwavering determination to continue to provide safe imaging, therapies and treatment to the most clinically vulnerable communities during this time.

Interruptions or distractions to routine tasks are part of everyday life in healthcare, but distraction has featured as a contributory factor in recent SAUE reports to the regulators; as a result, the regulators recommend that systems are put in place to minimise this[14,33].

Slips and lapses are more likely to occur when people are undertaking very familiar tasks – tasks that have been done so many times they are carried out on autopilot. This is when people are most vulnerable to distraction[58]. It is therefore recommended that when processes are designed, consideration is given to minimising opportunities for distraction from patients, members of the public and/or other healthcare professionals.

It is recommended that radiology service managers promote and support personal accountability and reflective learning. This may be done by adopting a common and consistent approach to incidents.

For example, anyone who identifies an incident should:

- understand the immediate actions required to prevent harm
- refer to a written procedure for recording the incident
- receive feedback from the investigation (either individually or as a group, whichever is more appropriate)
- understand their responsibilities under Regulation 20 (Duty of Candour) of the Health and Social Care Act 2008 (Regulated Activities) Regulations 2014, SI 2014/2936[41]
- identify the learning points and mitigating actions to prevent a repeat incident

Service leaders should:

- communicate the learning to all staff
- ensure any identified improvements/procedural changes are applied to practice
- measure the impact of the changes

It is a requirement of IR(ME)R Regulation 9 that the regulator has a mechanism to disseminate information regarding lessons learned from significant events. Examples of learning can be found in the published IR(ME)R inspection reports[7].

Details for the UK IR(ME)R regulators can be found in Appendix 3.

For notifications of SAUE in diagnostic imaging and nuclear medicine, the SoR recommends the use of the CIB coding taxonomy[38] alongside the helpful guide *User guidance and application of the national taxonomy for incident learning in clinical imaging, MRI and nuclear medicine*[37]. For radiotherapy and nuclear medicine incidents, the SoR recommends using the taxonomies from *TSR*[11] alongside the document *Development of learning from radiotherapy errors*[59].

With the ever-increasing demands on the radiographic workforce it can be challenging to pause and reflect, and time consuming to analyse incidents and identify effective learning points. Learning should be communicated and implemented, and the impact on patient outcomes should be measured. Adopting a Safety II approach[23,46] by retraining habits and redesigning processes in order to be more aware of the reasons behind what works well, to be more enquiring when something feels wrong and more alert to specific risks of something going wrong, could be considered a proactive and cost-effective approach. Cost being defined here as a measure of the emotional and physical harm to patients and staff following an error. Good practice for a Safety II culture includes:

- Teaching people to understand when and how to adapt. For example, what to do when an X-ray machine breaks down, a radiofrequency coil fails on a MRI scanner, or a particular contrast agent is not available. How might changing technique, equipment or medicines impact on patient verification in these cases?
- Developing a culture where people feel safe to ask questions and enquire further when they suspect something is not right. For example, a patient's details show the right address but the wrong date of birth.
- Discouraging a speed-over-safety attitude where assumptions are made to save time. For example, the referrer has not told the practitioner that there is a contraindication so the practitioner assumes it is safe to proceed.
- Celebrating excellence. For example, when someone has applied an innovative approach to solving a problem safely.

It is recommended that radiology service managers take time to consider what works well in terms of accurate patient identification processes and procedures, and that they share and celebrate this.

It is also recommended that radiology services work towards the use of common information standards and nomenclature for patient identification, and the use of the four core patient identifiers that must be included on an NHS identity band[46].

Recommendations summary

1. Radiology service managers in diagnostic imaging, nuclear medicine and radiotherapy should review their high-level organisational policies to ensure the minimum safe standard for positive patient identification is promulgated to all staff within the patient pathway.

2. Health leaders should reduce the risk of slips and lapses caused by fatigue by ensuring staffing levels are appropriate for safe service delivery. Staff should have reasonable shift patterns and appropriate rest breaks. Individuals have an equal responsibility to rest, recognise their own fatigue and seek support when required.

3. Radiology service managers in diagnostic imaging, nuclear medicine and radiotherapy should ensure, as a minimum, the CIB recommended twelve check points for accurate patient identification are embedded in local procedures and practice and are consistently applied.

4. Particular attention should be given to the correct identification of patients who are to be given a medicine as part of their diagnostic imaging, nuclear medicine or radiotherapy procedure.

5. Pre- and post-registration training and education should include learning relating to the impact of human factors on routine and atypical practice. This should explore how shared values, intentions and effective communication can underpin an effective safety culture and identify the barriers to incident prevention.

6. Service leads should seek to engage with their organisation's Patient Safety Specialist to ensure the radiographic workforce has access to enhanced patient safety training.

7. Radiology service managers should lead by example, focus on what works well and commit to a safety-first culture by promoting proactive and enquiring attitudes in diagnostic imaging, nuclear medicine and radiotherapy services.

8. There should be consultation with and investment from the workforce to develop written procedures that reflect the safe practice they naturally employ because of their education, training, skills and experience.

9. Where appropriate, when processes are designed/re-designed, consideration should be given to minimising opportunities for distraction from members of the public or other healthcare professionals. This applies to each stage of the patient pathway from identifying primary source data to accurate verification of patient identity. Particular attention should be given at patient handover points.

10. Radiology service managers should promote and support personal accountability and reflective learning across the multidisciplinary team. Individuals should take responsibility for their own actions and inactions.

11. Radiology services should promote safe, just and positive reporting cultures, recognising, sharing and celebrating when things go well. Effective leadership, trust and teamwork help create cultures of psychological safety.

12. Organisations should work towards the use of common information standards.

13. A risk assessment should be performed for each imaging pathway to assess the likely incidence and impact of imaging or treating the wrong patient.

14. Patients and carers should be empowered, through the provision of high-quality information, to question any imaging or treatment the patient is not expecting.

Where there is any doubt regarding the accuracy of information relating to a patient's identity, further checks should be undertaken prior to exposure; for example, by asking the patient to confirm what they believe they are there for or by calling the person responsible for the episode of care. If there is persisting doubt the exposure should not proceed.

Limits of the guidance

There are acknowledged limits to this guidance. The effects of the COVID-19 pandemic are not measured in the data. However, due to the pandemic, patient behaviour may have been influenced as anxiety levels and challenges with communication amongst mask wearers made positive identification more challenging. Primary source data may not have been available at the point of contact with the patient. Paper checking procedures may have been suspended without digital alternatives being available. Increased anxiety amongst staff, additional workforce challenges, the need to meet infection control requirements and the rapid introduction of process changes may have influenced the data. The donning of personal protective equipment (PPE) may have hampered verbal communication as part of identification processes. Additionally, face-to-face consultations were markedly reduced for much of the reporting period (1 January 2020 to 31 December 2020). However, the ongoing trend of patient identification incidents had been reported for several years prior to the start of the pandemic.

Successful implementation of this guidance will require strong leadership to change habits and in some cases cultures and will require regular audit to assure any improvements are sustained. This will require time and buy-in from senior leaders at organisational board level.

SoR approval process

The SoR is the trade union and professional body for the radiographic workforce. It offers professional leadership and guides and supports professional development in the interests of patients and high-quality health and care services. The final draft of this guidance was submitted for consideration and received approval from the SoR UK Council on 23.03.2022. It was revised following publication of The Ionising Radiation (Medical Exposure) (Amendment) Regulations 2024[3].

Thanks to contributors

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- Consultant Advisory Group
- Diagnostic Imaging Advisory Group
- Patient Advisory Group
- CT Advisory Group
- Radiotherapy Advisory Group
- Nuclear Medicine & Molecular Imaging Advisory Group (NMMAG)
- MR Advisory Group
- Ultrasound Advisory Group
- Radiographic Informatics Advisory Group (RIG)

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Appendix 1

List of Working Party members

Andrea Bangay, OP, Mobiles and Paediatric Lead Radiographer. University College London Hospitals NHS Foundation Trust

Jo Browne, Regulation and Quality Improvement Authority (RQIA)

Úna Findlay, Senior Radiotherapy Clinical Officer & Chair of Patient Safety in Radiotherapy Steering Group. UK Health Security Agency (previously Public Health England)

Kevin Freeman-Ferguson, Health Improvement Scotland (HIS)

Spencer Goodman, Professional Officer for Radiotherapy, Society of Radiographers

Lynda Johnson, Professional Officer (Clinical Imaging) (Chair), Society of Radiographers

Sue Johnson, Professional Officer (Clinical Imaging),Society of Radiographers

Rachel King, Patient Advisory Group, College of Radiographers

Andrew Pryse, Health Inspectorate Wales (HIW)

Anthony Richards, Diagnostic Advisory Group, Society of Radiographers

Helen Wickham, Regional Officer, Society of Radiographers

Holly Warriner, IR(ME)R Clinical Specialist Inspector, Care Quality Commission (CQC)

Appendix 2

Terms of Reference

1. To define identification incidents in diagnostic imaging, nuclear medicine and radiotherapy.
2. To describe the existing guidelines, principles, policies and procedures in place to prevent identification incidents of individuals.
3. To investigate why an individual might receive an unintended or accidental dose of radiation or wrong radiopharmaceutical or other medicines related to their screening, diagnosis or treatment.
4. To consider the impact of contributory factors (CF) on identification incidents.
5. To develop practical and meaningful guidance for the radiographic workforce that can be used consistently and effectively in diagnostic imaging, nuclear medicine and radiotherapy departments.
6. To promote the guidance to the radiographic workforce and the public.
7. To monitor implementation of the guidance and measure impact.

Appendix 3

The IR(ME)R regulators in the United Kingdom

England: The Care Quality Commission

Wales: Healthcare Inspectorate Wales

Northern Ireland: The Regulation and Quality Improvement Authority

Scotland: Healthcare Improvement Scotland

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