Standards for interpretation and reporting of imaging investigations

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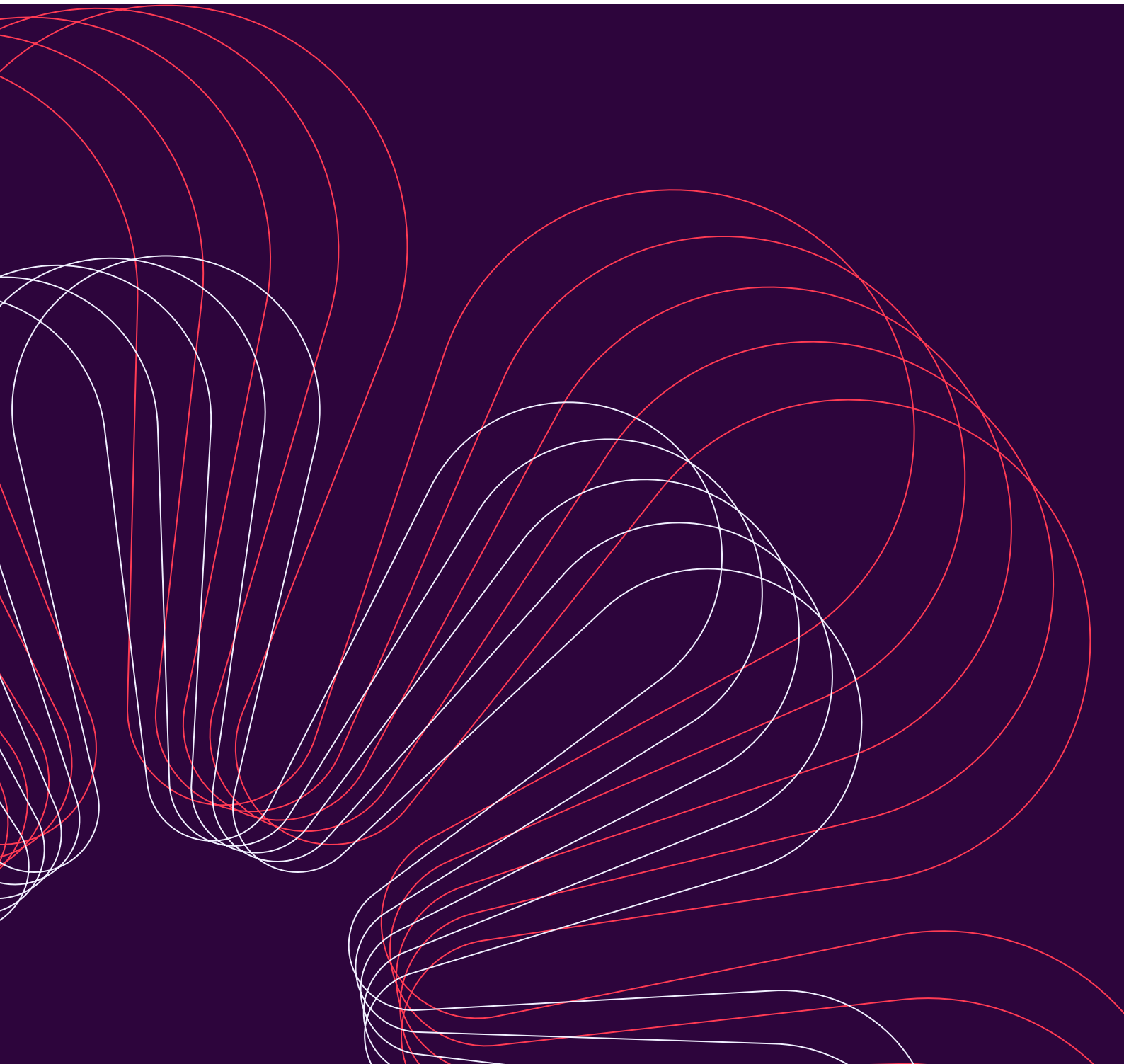

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01 Introduction

Radiological investigations must be interpreted and reported on to a high standard. Clear communication of these results to the referrer ensures that patient care is delivered safely, effectively and efficiently.

This document has been written by and for radiologists, who are experts in interpreting medical imaging, with contributions from other professional groups. In keeping with the role of The Royal College of Radiologists (RCR) as defined in its royal charter, it defines the expected standard of care for reporting radiological investigations. It underpins radiologists' role as leaders and experts in medical imaging but should apply to all who interpret and report imaging, regardless of their professional background.

Modern radiology services are under pressure due to increasing diagnostic demand in the face of chronic workforce shortages.[1] Consequently, imaging reporting services need to remain led by consultant radiologists but will not be entirely radiologist delivered.

Some imaging reporting is performed by non-radiology doctors and clinical referrers. Where a formal written report is to be provided by doctors with a narrower scope of imaging practice (eg from cardiologists interpreting cardiac cross-sectional imaging) these same standards will apply; where there are areas of imaged anatomy beyond the expertise of the interpreter, an agreement for review by a radiologist should be arranged. Where the imaging interpretation is delegated to the referrer (eg orthopaedic surgeons, where a formal radiology report is not required), written documentation of the interpretation should be recorded in the patient's notes by the referrer to satisfy the requirements of the Ionising Radiation (Medical Exposure) Regulations (IR(ME)R).[2, 3, 4]

Some imaging reporting is delegated to non-medical practitioners with a narrow scope of practice (eg sonographers and radiographers). These colleagues should undertake this work within consultant radiologist-led teams with clear lines of supervision and support and should also aim to achieve the standards in this document within this team structure.

High-quality image interpretation starts with high-quality referrals. The responsibilities of the referrer are enshrined in law under IR(ME)R; there is a duty placed on all referrers to provide adequate and accurate patient histories and to clearly articulate the clinical question(s) that they wish the radiological imaging investigation to answer. In order to support safe care, there is a similar requirement for high-quality referrals for all imaging modalities.

This document provides a detailed focus on the post-acquisition phase of the diagnostic radiology life cycle, the stage during which reporting takes place. For guidance on the broader imaging workflow, including standardised terminology and performance metrics such as time to imaging acquisition and time to report, please refer to the Diagnostic radiology life cycle guidance.[5]

02 Service organisation

- Providers should create standard operating procedures that comply with national guidelines for the following, and review them on a regular basis:[6, 7, 8]
  - Turnaround times.[5, 9, 10]
  - Communication of unexpected or time-critical findings.[11]
  - Imaging classification (eg critical, urgent, routine, research trial etc) for reporting priority.
  - Communication of addenda, including subsequent or multidisciplinary team reviews.
  - Report acknowledgement.
- Patient safety and optimal outcomes require timely, accurate, actionable reporting of radiology investigations. These principles apply to anyone providing the report and to all providers of reporting services.

03 Reporting author

- The report should:
  - Clearly state the name of the author, their job title or professional status, registration body and registration number. The prefix title 'Doctor' or 'Dr' should only be used to indicate a medically qualified practitioner; non-medical practitioners with a PhD can use this as a postnominal but should not use the prefix title 'Dr' on imaging reports.
  - Not include personal contact details.
  - Include the names of all authors that have contributed to the report. For radiological and interventional procedures, the author should be either the operator or the assistant. The primary operator should be clearly indicated.
- Employers have a duty of care to patients and should ensure no employee is permitted or required to work beyond their level of knowledge and competence or to work without adequate rest.[12]
- The reporting author should be registered with the relevant regulatory body in the UK (eg General Medical Council, Health and Care Professions Council) and in good standing. They should be trained in accordance with their professional body's standards and work within a defined scope of practice.
- Reporting authors should comply with all ongoing continued professional development, audit and, where applicable, revalidation processes.
- The individual reporting the examination must be able to evaluate the quality of the images and their suitability for diagnosis as per the RCR Clinical radiology specialty training curriculum.[13] Suboptimal image quality should be recognised if this affects the diagnostic accuracy of the examination and the need for a repeat examination or for caveats to be included in the report.

04 Infrastructure

Technology support

Quality of equipment for reporting, standards for integrating artificial intelligence (AI) and reformatting capabilities are covered in Picture archiving and communication systems (PACS) and guidelines on diagnostic display devices and Integrating artificial intelligence with the radiology reporting workflows (RIS and PACS).[14, 15]

- The patient's imaging history and reports should be available. It is recommended that relevant clinical information, including patient medical records and laboratory results, should be accessible.[14]
- Organisations with the technological capability are encouraged to implement a brief, controlled delay (eg up to 2 minutes) before a report is made accessible to other users. This short window is intended solely to allow the reporting clinician to make immediate corrections of typographical errors. Once a report has been accessed by another party, any subsequent changes should be subject to formal version control procedures, including clear documentation of the amendment and appropriate notification to all relevant users.
- Providers should ensure that reports can be automatically communicated to other information technology systems accessed by clinicians.[16]

Voice recognition

- Voice recognition software can be an integral part of reporting and is encouraged to enhance workflow. The employer should ensure software and associated hardware are available, perform and are maintained to current best standards.
- Typing or alternative methods for recording report text may be used, provided they are no less effective or efficient than high-quality voice recognition.

Artificial intelligence assisted reporting

AI has the potential to make a significant difference in healthcare settings through its ability to analyse large quantities of complex information.[17] It can aid in optimising the patient journey throughout the pathway including radiology requesting, scheduling, vetting, planning, scanning, report sharing and treatment pathway planning.[18] In 2024, the RCR published AI deployment fundamentals for medical imaging and is actively developing new guidance to keep pace with the evolving role of AI in radiology.[19]

- Validated AI tools should be integrated appropriately into the reporting workflow, so that it makes reporting more efficient and enables safer and actionable reporting.
- AI-generated content should be clearly identified as such within the report. All AI-derived contributions should be reviewed, verified and approved by a named human author, who is responsible for the final report.
- It is incumbent on the employer to provide adequate training on the use of any AI deployed locally.

04

Infrastructure

Remote reporting (including teleradiology)

The term remote reporting refers to the reporting of imaging examinations at a distance from where these examinations were performed. Arrangements should be developed in conjunction with wider service planning frameworks. For considerations related to staff availability, scheduling and safe working patterns, providers should refer to the RCR's Clinical radiology job planning guidance for consultant and SAS doctors.[20]

- Arrangements for remote reporting, including home reporting should not compromise the quality of reporting delivered from comparable in-hospital settings.[21]
- Local or regional network reporting arrangements must comply with the same technical specifications and governance as provider-based reporting. Workflow and handling of report communications should be documented.
- Those reporting remotely should have access to clinical documentation and imaging records to ensure accurate interpretation within the correct clinical context. Where the reporter may not be familiar with local care pathways, providers should implement mechanisms to support contextual understanding (eg liaison with clinical teams or multidisciplinary team participation).
- Local operating policies should include business continuity plans to maintain service delivery in the event of technical or other operational failures.[22]
- Teleradiologists working for private providers may be unfamiliar with local patient care pathways. Organisations using such services must ensure that adequate safeguards are in place to mitigate this.

05 The report

General considerations

- Clinical details should form part of the report. Interpretation may be incorrect if referral details are deficient, absent or misleading; inclusion of the referrer's text is recommended as it may be a consideration for future review.
- Many radiology information systems generate clinical details from the referrer's text. More detail or context should be added where this impacts scan interpretation.
- Where past treatment has an impact on image interpretation, treatment history should be recorded.
- Reporters should maintain professional standards if commenting on referrers, patients, hospital environment or equipment. If scan performance has been compromised then relevant, factual, non-judgemental statements may be included.
- Careful proofreading is vital. As well as improving readability, this can prevent common and potentially serious grammatical errors such as missed negatives, word substitution and wrong side attribution.

Scan protocol and technical detail

- Including scan protocol and technical detail in the report may be appropriate if it aids understanding, justifies technical parameters, adds value to the report or details potential deficiencies in scan performance or acquisition.

Observations and findings

- An observations section should state the relevant and pertinent findings and allow incidental findings to be mentioned and explained.
- Guidelines and experience should be used to ensure reports do not contain irrelevant incidental findings or lists of irrelevant negative observations. These can detract from the impact of the report and generate unnecessary additional tests.
- All images acquired, including planning (eg scout) images and non-target areas, should be reviewed to ensure patient safety. Complex studies such as cross-sectional imaging may be reported predominantly for a single clinical purpose, where reporting focuses on specific target areas; however, there should be provision to ensure competent and holistic review of all relevant findings by a radiologist. Responsibility for reviewing non-target areas lies with both the reporter and the employer. Where reporting is limited, employers should consider the resource implications of any required secondary review.
- Where prior imaging is a modality or covers an anatomical area beyond the scope of practice of the reporting author, they should seek additional review by a radiologist to avoid incorrect conclusions or suggestions for unnecessary investigations. If such imaging is unavailable and its absence may impact interpretation, this should be documented.
- Technical terms and imaging terminology have utility for specialist readership, to explain why conclusions might have been reached or justify conclusions.

Standardised and structured reporting

- Reporting style may vary based on clinical context and referrers' needs but should prioritise clarity and clinical relevance.
- The use of structured templates is encouraged where suitable.[23] Templates are helpful for

adequacy of data collection. Specific examples include supporting research using RECIST criteria, for National Cancer Registry data, for audit and quality assurance purposes (eg World Health Organization checklist) and trauma reporting.
- Structured or AI-generated report formats should not be used to imply a degree of scrutiny that has not taken place.
- Templates may be adapted to omit fields that are not relevant to the specific case.

Report conclusion

The conclusion section (sometimes termed comments, impressions or opinion) is a key component of a report and should be short and actionable. While its style and content may be subject to differing opinions, the following provides good practice guidance. Short reports such as those for radiographs, procedures or ultrasound may not require a conclusion.

- The report conclusion section should:
  - Directly answer the clinical question and, where relevant, show interpretation to address implied questions.
  - Be tailored to the named referrer as the target readership (eg primary, secondary or tertiary care) explaining technical radiological terms as necessary.
  - Avoid unnecessary repetition of content already stated in the body of the report unless it is required.
  - Convey the sensitivity of the test for the clinical question if needed.
  - Document any limitations in the likely sensitivity or specificity of the study using clear, factual and non-judgemental language.
  - Explain areas of uncertainty within the radiology diagnosis or provide a ranked differential diagnosis.
  - Aim to provide a single or differential diagnosis and advise how any differential diagnoses can be refined.
  - Clarify if the scan did not address something that it needed to, and if so recommend further tests or actions.
  - Highlight where non-imaging results will potentially alter interpretation and how this might occur.
  - Make clear, specific recommendations. Avoid blanket phrases such as ‘clinical correlation advised’. Further imaging recommendations are useful but should be used judiciously. Further tests should add value to the overall patient’s care, and the referrers should be involved in deciding their need.
  - Follow guidelines where these are accepted and useful for incidental findings. Reference them where helpful or explain when further action is not needed.
  - Ensure clinically important incidental findings are communicated appropriately.

Interventional radiology reporting and procedural description

- Interventional radiology reports should:
  - Be written and communicated promptly following completion of the procedure. If there are subsequent diagnostic conclusions, these should be captured separately or be included as an addendum.
  - Comply with clinical radiology subspecialties and special interest group guidance.[24] If local practice is not to obtain written consent for a procedure, verbal consent and complications discussed should form part of the report.
  - Include instructions on aftercare or need for follow up procedures or imaging.
  - Document relevant narrative of the intervention, and where possible its consequences including drug administration, efficacy and complications, or how efficacy should be assessed.

05

The report

- There may be a significant variation in the report layout depending on the type of procedure. The use of pro formas should be considered as they can assist data completeness for later review, or further intervention.

Patient access

Improved access to health information enables patients to become partners in managing their health. For further guidance on patient notification of diagnostic imaging results, refer to NHS England's recommendations.[25] This document indicates that the referrer who requests the test is responsible for reviewing, acting on and communicating the result. The timelines for patient access are discussed and should be short, while making sufficient provision for adequate arrangements to communicate the findings in an appropriate and supportive environment.

When accessed by a patient, reports should be viewed with a standard phrase 'This report has been sent to the referring clinician (doctor or other healthcare professional) who referred you for this investigation. If you have any questions, please discuss with your referring clinician.' Depending on local process this might be added to the text of a report or be added by the viewing platform.

Conclusion

The standards in this document provide a baseline that all radiology reports should achieve, so that the quality and consistency of imaging interpretation can be assured. Adherence to these standards will ensure that image interpretation continues to add value to patient diagnostic and treatment pathways.

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