

Standards for the Reporting and Interpretation of Imaging Investigations



Board of the Faculty of Clinical Radiology
The Royal College of Radiologists

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RCR Standards

The Royal College of Radiologists, a registered charity, exists to advance the science and practice of radiology and oncology.

It undertakes to produce standards documents to provide guidance to radiologists and others involved in the delivery of radiological services with the aim of defining good practice, advancing the practice of radiology and improving the service for the benefit of patients.

The standards documents cover a wide range of topics. All have undergone an extensive consultation process to ensure a broad consensus, underpinned by published evidence, where applicable. Each is subject to review four years after publication or earlier, if appropriate.

The standards are not regulations governing practice but attempt to define the aspects of radiological services and care which promote the provision of a high quality service to patients.

Dean's Foreword

Referral for an imaging examination is generally regarded as a request for a clinical opinion from a specialist in radiology or nuclear medicine. The opinion given in the report should assist in the diagnosis and future management of a particular clinical problem.

With the advent of an increasing workload and an expanding and increasingly complex range of examinations, reporting has been increasingly undertaken by specially trained radiographers and by clinicians in certain specialist fields. As these models of imaging and reporting become ever more diverse, the Royal College of Radiologists felt that it was important to set the standards of what was required in an imaging report, whoever was issuing that report.

To maintain good safe patient care, individuals issuing reports should be working closely with the Department of Radiology within their Trust, either as part of a team led by the imaging department or to agreed protocols. The College is very grateful to members of the RCR Standards Sub-Committee for its work in preparing this publication and, in particular, to Dr Jane Adam for tireless efforts. The College is particularly grateful for the speed and efficiency of both the Standards Committee and Faculty Board for enabling this document to be published so expeditiously.

Dr Gill Markham

Dean and Vice-President

Faculty of Clinical Radiology

Royal College of Radiologists

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1 Introduction

The purpose of an imaging report is to provide a specialist interpretation of images and relate the findings, both anticipated and unexpected, to the patient's current clinical symptoms and signs in order to diagnose or contribute to the understanding of their medical condition or clinical state. It often incorporates advice to the referring clinician on appropriate further investigation or management.

Clinical governance

In order to contribute to patient management, accuracy of image interpretation is crucial. To this end, audit and reporting of discrepancies and feedback of errors should be carried out in all radiology departments and should comply with the Trust's clinical governance procedures. Where imaging reports are issued by teams or departments outside the radiology department, they should also be subject to the Trust's policy for governance.

Individuals who perform a limited number of examinations outside a team setting are most at risk of inadequate performance. Patient safety is therefore best served by individuals working within an organised co-operative team with robust clinical governance procedures in place (1).

Personnel who provide imaging reports

Radiological reports in the UK are usually provided by radiologists, who are qualified doctors with at least 2 years postgraduate experience followed by 5 years accredited training and the successful completion of the FRCR examination in specialist interpretation of a wide range of imaging. This is followed by annual appraisal in their consultant post and a 5-yearly revalidation process to establish their continued fitness to practise.

As in other areas of healthcare, some radiological services are being delivered by non-medically qualified healthcare professionals. In the interests of good clinical care and patient safety these individuals should work in a team with ready access to a fully trained radiologist for advice (2).

The types of investigation which may be suitable for primary reporting by healthcare professionals without the benefit of a medical degree are those where there is a single organ investigation, with a single suspected pathology and a yes/no answer.

It should be appreciated, however, that in these circumstances unexpected or unrelated pathology may not be diagnosed.

Some non-medically qualified staff will have the interest and motivation to acquire further medical knowledge relevant to their practice, and be able to provide a more comprehensive service, for example in ultrasound. However, the absence of full medical training cannot be completely compensated for, as the imaging findings cannot be predicted in advance and may prove to be more complex than expected. Any individual issuing an imaging report must ensure that they are appropriately trained and practise within their competence.

The radiologist and the hospital Trust have a duty of care to the patient to ensure that non-radiologists who are undertaking image reporting are not expected to work outside their level of knowledge and expertise.

With the advent of teleradiology systems, investigations may now be reported at a distance from where they were performed. Such reporting systems must ensure that the quality of the service to the patient is not compromised in any way. The non-medically qualified practitioner and any doctor outside the NHS, in this country or abroad, should have undergone appraisal and audit of his/her work to a level comparable to that found within the NHS. Documentary evidence of this is essential before delegating image reporting to these systems (3).

2 The essential steps in producing an imaging report

A radiological report constitutes a clinical opinion, unlike an automated measurement tool. Clarifying the steps involved makes it possible to evaluate which examinations may reasonably be reported by non radiologists, or by radiologists practising remotely, possibly in a different part of the world from that in which the patient has been examined.

A. Understanding the clinical information

The referring clinician should have provided information on the request form that he/she thinks relevant to the interpretation of the images. The specialist background of the referrer should be clear (see sections G & H). The information provided may include medical signs/symptoms pointing to a particular diagnosis or range of diagnoses, or enumerate the possible diagnoses that are being considered. The individual reporting the investigation must understand the explicit and implied information given on the form, in particular, all the named diagnoses/conditions and the relevance and the diagnostic importance of any test results supplied. He/she should also have knowledge of commonly used medical abbreviations.

B. Technical knowledge

Producing images of diagnostic quality requires skilled and appropriately trained staff. The individual reporting the examination must be able to evaluate the quality of the images, and their suitability to the diagnosis of the suspected condition/s. Where the images are suboptimal, or incomplete, for example insufficient sequences for an MRI study, this must be appreciated by the reporter who must also have sufficient technical knowledge to know to what extent this will affect the diagnostic accuracy of the examination and whether the patient needs to be recalled or caveats need to be included in the report.

C. Observation

Careful cross-checking of patient identification is required as part of the initial assessment of the image/s, together with confirmation that the type and date of the examination are correct.

Radiologists are trained observers. Both 'passive' and 'active' observation are used i.e. abnormalities will strike those with a trained eye, but the images must also be specifically interrogated in appropriate viewing conditions to ensure that all findings have been noted. On the basis of these observations the following may be found:

- Normal findings
- Unequivocal abnormal findings, both anticipated and unanticipated
- Findings that may be normal or abnormal
- Normal variants.

D. Analysis

Definitive or equivocal abnormalities are then further evaluated for relevant imaging characteristics, for example shape, contour, density, enhancement pattern, signal intensity, and echogenicity to formulate an opinion on whether there is an active pathological process present or whether the finding can be encompassed within the range of normal appearances, such as age-related change, radiographic artefact, finding related to projection, or insignificant or old 'burnt-out' pathology.

If the findings are considered to represent an active pathological process, the image characteristics are further scrutinised to narrow the differential diagnosis, e.g., probable benign, or consolidative process.

E. Medical interpretation

The image analysis is correlated with other factors to interpret the radiographic findings and their relevance to that particular patient. Here a wide medical knowledge is required to reach a specific diagnosis or appropriately ranked differential diagnosis sufficient to allow clinical decisions to be taken. Essential knowledge to allow this includes knowledge of diseases which could, in a patient of this age, sex, ethnicity and demographic characteristics produce imaging findings of this type, and their relative prevalence in the population. This must be linked with an understanding of the clinical state of the patient, their signs and symptoms and the results of other radiological, pathological, laboratory and clinical tests as provided on the request form. Previous imaging investigations should be available for review and where further information may substantially influence the radiological opinion, this should specifically be sought from the referring clinician or via laboratory/histology reports.

Taken together, these factors will allow a clinically relevant opinion to be given that encompasses all the known factors about the patient, as well as the imaging findings.

F. Advice

The individual reporting an examination must be aware of the likely accuracy of the examination in that particular patient related to the published accuracy of the technique, and its applicability to this particular examination, e.g., quality of images obtained, body habitus, etc. The level of certainty or doubt surrounding a radiological diagnosis should be clearly indicated in the report. If a definitive diagnosis is given it should be assumed that this will be used for patient management.

If a definitive diagnosis is not possible, then advice about further investigation should be given on the basis of knowledge of the relative accuracy and applicability of the suggested investigations, both in absolute terms and in relation to the individual patient concerned. Further investigation should be suggested only where necessary, particularly when it entails discomfort or radiation exposure for the patient.

G. Communication with the referrer

The author of an imaging report and his/her professional status must be clear to those reading or receiving the report.

The purpose of the report is to provide a timely answer to the clinical questions posed, together with an assessment of the whole image for relevant and/or unexpected findings. The written report should be clear, and written in a way appropriate to the referrer's expected level of familiarity with the issues raised, and their access to further investigations. The wording of the report is likely to differ when it is written to a general practitioner who may be unfamiliar with a relatively rare condition, compared with a specialist in that particular field

The usual format will include:

- clinical details (unless the request form details are readily accessible for review)
- a description of the findings, and
- a conclusion or interpretation of the findings in the clinical context.

The report constitutes a clinical opinion on the examination, and should therefore convey a knowledgeable and reasoned assessment of the examination and its contribution to the overall management of the patient. For some examinations, such as vascular studies, diagrammatic representation of findings may be appropriate.

There must be a reliable mechanism in place whereby the referring doctor can discuss the imaging findings in complex cases in more detail with the radiologist or other individual who has reported the examination in order to better understand the implications and reliability of the findings or to provide further clinical information which may affect the interpretation.

Attendance at clinico-radiological meetings will facilitate this process.

H. Taking appropriate action

There should be effective and timely communication of imaging reports. There are situations where “routine” methods of communication of imaging reports to clinicians are inadequate (4). Direct communication by telephone is clearly indicated if a patient has a medical condition requiring emergency treatment, for example pulmonary embolism or tension pneumothorax. Additional mechanisms for ensuring that the referrer receives the report in a timely fashion are also indicated when the usual methods of report transmission could lead to delays in treatment. Imaging findings that suggest serious pathology, e.g., likely malignancy that are thought to be unsuspected should be communicated in a manner that reasonably ensures timely treatment. This should comply with agreed local alert mechanisms (5). Urgent communication may also be required to prevent potential harm to others, for example when there is evidence of open tuberculosis. When additional steps have been taken to ensure urgent communication of imaging findings, this should be recorded in the report.

I. Communication with the patient

All doctors are bound by advice given by the General Medical Council which allows them licence to practise.

The patient must always be treated with respect and honesty. If the patient asks what an examination has shown it may be neither possible nor desirable to give a definitive result if the radiologist, or individual reporting the examination, has not had time to make a thorough assessment of the investigation. Where the individual is in a position where they may have to convey bad news they should have received appropriate training to do so. It is inadvisable to enter into any detailed discussion about further management with the patient unless the individual has sufficient knowledge to do so, but having discussed the imaging findings with the patient, the radiologist must ensure that there is appropriate follow-up with someone who will be involved in their further care and can answer their questions.

Patients now have access to medical correspondence about them and in some cases this will include radiological reports. This should be borne in mind in the wording of the report.

3 Current / future context

Currently, the majority of radiology reports are provided in the context of patients who have known or a strong suspicion of disease. The move to a more aggressive approach in the detection, investigation and treatment of disease, particularly cancer, may result in an approach closer to screening, and is likely to result in a higher proportion of negative radiological examinations than at present. It is important that the limitations of each examination and its risks, radiation or otherwise, are understood by all involved. In all patients, but particularly in circumstances where the principal purpose of a radiological investigation is to exclude pathology, knowledge of the negative predictive value of an examination and the necessity for, and accuracy of, further tests will be required. In addition, review of images requested for a particular purpose may reveal incidental findings or pathology unrelated to the initial request, requiring a wider knowledge of disease processes and their imaging manifestations than is at first apparent.

In deciding how a service is provided for the interpretation and reporting of images, all the factors discussed above must be taken into account.

4 Summary of standards

1. Robust clinical governance procedures must be in place and be applied to imaging investigations and reports, wherever they may originate.
2. Non-radiologists who interpret images should work in teams with ready access to radiologists for advice.
3. The type of investigation most likely to be suitable for interpretation by those without medical training is that which involves a single organ, with a single suspected pathology and a yes/no answer.
4. Radiologists and Trusts have a duty of care to the patient to ensure that no individual who reports imaging investigations is expected to work beyond their level of knowledge and competence.
5. An individual who reports an investigation must understand the explicit and implied information on the request form.
6. An individual who reports an investigation must have sufficient technical knowledge to assess image quality and know the limitations of the investigation in a particular patient.
7. An individual who reports an investigation must have been trained in radiological observation and analytical skills.
8. Medical training is required when imaging findings are correlated with clinical details and the results of laboratory tests to make a clinical diagnosis.
9. Further investigations should only be suggested if they are medically indicated and will contribute to patient management.
10. The professional status of an individual who reports an investigation should be clear on all written reports.
11. The wording of the report should be clear and take into account the professional background of the referrer.
12. There must be a reliable method for the referrer to discuss difficult cases in more detail with the individual who reports the investigation.
13. An individual who reports an investigation must recognise when the findings constitute a medical emergency and comply with local mechanisms to alert referrers in urgent cases.
14. All communication with the patient must adhere to professional guidance.

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