



The Royal College of Radiologists

Board of the Faculty of Clinical Radiology

Standards for Self-assessment of Performance

RCR Standards

The Royal College of Radiologists (RCR), 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.

Current standards documents

Standards for Radiology Discrepancy Standards

Standards in Vascular Radiology

Standards for Ultrasound Equipment

Standards For Iodinated Intravascular Contrast Agent Administration To Adult Patients

Standards for Patient Consent Particular to Radiology

Standards for the Reporting and Interpretation of Imaging Investigations

Cancer Multidisciplinary Team Meetings – Standards for Clinical Radiologists

Technical Standards for CT

Technical Standards for Ultrasound Equipment

360° Appraisal – Good Practice for Radiologists

Individual Responsibilities – A Guide to Medical Practice for Radiologists

Contents

Foreword	4
1. Introduction	5
2. What is a good radiologist?	5
3. Methods of self-assessment	6
3.1 <i>Professional meetings</i>	6
3.2 <i>Discrepancy meetings</i>	6
3.3 <i>Audit</i>	7
3.3.1 Local audit	7
3.3.2 National audit	7
3.4 <i>Peer review</i>	8
3.4.1 Multisource feedback	8
3.4.2 Double reporting and other methods of peer review	8
3.5 <i>Use of self-assessment tools</i>	9
3.5.1 Electronic self-assessment	9
3.5.2 Self-assessment of knowledge	9
3.5.3 Other appraisal tools	9
3.6 <i>Recording of all documentation relating to performance</i>	10
3.7 <i>Assessment of performance in post</i>	10
3.8 <i>Continuing professional development</i>	10
4. What to do with the information	10
5. What to do if self-assessment reveals a problem or a potential problem	10
Appendix: definition of terms	11
1. <i>Accuracy</i>	11
2. <i>Error</i>	11
3. <i>Reporting discrepancy</i>	11
4. <i>Inter-observer variation</i>	12
5. <i>ROC curves</i>	12
6. <i>Normal distribution</i>	12
7. <i>Intra-observer variation</i>	12
References	13

Foreword

With the recent publication of The White Paper, *Trust, Assurance and Safety – The Regulation of Health Professionals in the 21st Century*,¹ the issue of professional revalidation and fitness to practise is at the forefront of everyone's mind. In order to maintain the appropriate levels of fitness to practise, The Royal College of Radiologists is recommending that radiologists perform self-assessment on a regular basis to highlight strengths or weaknesses in their practice and take measures where necessary to improve. Self-assessment can occur in many forms including audit, peer review, using self-assessment tools and obtaining continuous professional development points. This document offers advice on how to self-assess to ensure that all radiologists are practising to the best of their ability.

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Vice-President and Dean

Faculty of Clinical Radiology

The Royal College of Radiologists

1. Introduction

It is the duty of doctors to ensure that they have the ability to perform clinical and practical skills safely in line with current standards and to recognise personal and professional limits. To this end, guidance from the General Medical Council (GMC)² on maintaining good medical practice requires that individuals:

- Acquire and use new knowledge to update practice and adapt to changing circumstances
- Understand the principles of audit and the importance of using audit results to improve practice
- Be willing to respond positively to the results of appraisals, performance reviews and assessments.

The Chief Medical Officer's (CMO) final recommendations on revalidation and recertification were published in February 2007.¹ For doctors, the government endorses the revalidation proposals set out in the CMO's report, *Good doctors, safer patients*.³ Medical revalidation will have two core components: relicensure and specialist recertification. In respect to revalidation, doctors will be required to 'demonstrate objectively that they have kept up to date' and 'that they continue to apply through their practice the values they committed themselves to when their names were first placed on their professional register'.¹ The RCR is considering the ways in which it will develop the standards which will be set for clinical radiology.

These standards for self-assessment are designed to help radiologists start to think about the ways in which they can measure their performance. The Standards Sub-committee would welcome feedback from members and Fellows of the RCR to help guide future development of these standards.

2. What is a good radiologist?

Definitions may vary slightly but most would agree that a good radiologist has a strong body of medical and radiological knowledge which is continually updated; is a skilled observer; has image analysis skills; is able to correlate imaging, clinical and other information to reach a well-judged, clinically relevant medical opinion; and is able to communicate well and give sound advice about further management. They are able to teach and communicate their knowledge to others.

There is no objective test to 'prove' that an individual fulfils all these criteria but different forms of self-assessment may be used to indicate areas of strengths or weaknesses in an individual's practice to allow remedial action or further training where necessary.

3. Methods of self-assessment

Methods available include:

- Professional meetings
- Audit
- Peer review
- Use of self-assessment tools
- Recording of documentation of thanks, praise, complaints, clinical incidents and legal cases
- Recording performance in post, including adherence to job plan and workload
- Number of continuing professional development (CPD) credits obtained.

For definitions of terms used within the document, please see the Appendix, page 11.

3.1 Professional meetings

Most radiologists participate in clinico-radiological meetings and, more recently, multidisciplinary team (MDT) meetings which were instituted as part of *The NHS Cancer Plan*.⁴ These offer an opportunity to review investigations that have already been formally reported. Errors may sometimes be detected at this stage, or further clinical information which may clarify the radiological appearances may emerge, making these valuable from both an educational point of view and for self-audit or peer review. Formal data collection from MDT meetings and other clinical meetings will facilitate more formal self-audit. Examples of audits would include attendance rates at MDT meetings (guidance from the RCR suggests that at least 50% of meetings should be attended by the lead radiologist⁵). A formal retrospective review of a number of random cases correlated with their respective pathological and operative findings is also recommended for self-audit, and although it may be difficult to find relevant published standards with which to compare performance and to measure performance in a way that withstands statistical scrutiny, the data gathered will be of educational value and may indicate areas of weakness or points to be addressed. Errors should be presented at discrepancy meetings.

Potential information gained

- a. Adherence to job plan and cancer standards for MDT meetings
- b. Personal accuracy rates for reporting

3.2 Discrepancy meetings

All departments should hold discrepancy meetings, and radiologists should attend at least 50% of these meetings annually.⁵ The RCR has produced guidance offering information and advice on discrepancy meetings.⁶ Although the cases presented are anonymised, individuals should be aware of their own cases and take particular note of any recurrent errors. Errors which result in actual or potential patient harm should be reported as clinical incidents. The possible impact of any error and the advisability of clinical incident reporting in any given case are best judged in

such a forum by a consensus view. Attendance at discrepancy meetings should be formally recorded and data made available for appraisal purposes.

Potential information gained

- a. Common departmental errors and causation
- b. Repeated personal errors

3.3 Audit

3.3.1 Local audit

Radiologists should participate in the local audit programme and initiate audits in their own areas of responsibility or expertise. Published standards are not always available, although there are some produced by the RCR; for example, *Standards for Vascular Radiology*.⁷ An alternative source is published literature, although published figures may be regarded as a 'gold standard' set by experts. Information from individual audit should be included in the appraisal folder for discussion at the annual appraisal interview. Radiologists should be open to suggestions for audit of their own work and be prepared to examine and address any areas of weakness revealed. The sharing or presentation of anonymised audit data allows educational benefit to be gained by others as well as the individual.

Potential information gained

- a. Individual performance data

3.3.2 National audit

The RCR conducts national audits and all departments are invited to participate. These are designed to be statistically robust and, using control chart methodology, will determine whether performance at an individual site is within the normal range of common cause variation or whether there is special cause variation; that is, whether performance is unusually good or poor. An example of a national audit related to individual performance includes the use of barium enema⁸ to diagnose colonic cancer. Where performance falls outside common cause variation, advice is available from the RCR audit office on how to examine the data to determine the cause of a poor performance which may be organisational, systems-based or individual.

Potential information gained

- a. Departmental performance compared with national performance

3.4. Peer review

3.4.1 Multisource feedback

The RCR has produced a 360° appraisal template for the purposes of multisource feedback (MSF).⁹ Individuals are encouraged to carry out MSF appraisal at least once every three years. The appraisal is a wide-ranging assessment of the personal performance of a radiologist, including professional competence, and personal skills and attributes. These are all important pieces of information in the assessment of an individual's performance in post. The results should be discussed at the appraisal interview with a précis of the results collated by the appraiser being available to the radiologist to enable them to address deficiencies, both personal and professional. If significant issues are identified in the MSF process, it is inadvisable to delay a repeat appraisal for three years, as one would need to provide reassurance that any problems are being addressed.

Potential information gained

Assessment of:

- a. Global performance in post
- b. Communication skills
- c. Quality of reports
- d. Ability to analyse complex problems
- e. Quality of advice given

3.4.2 Double reporting and other methods of peer review

Double reporting is recognised as a tool for increasing accuracy in reporting. Current staffing levels allow it to be used routinely only in very limited circumstances such as the NHS Breast Screening Programme. More recently, peer review or double reporting of 10% of a radiologist's workload has been suggested as a quality assurance tool. Under present circumstances, it may not be possible to carry out double reporting on a routine or regular basis, but sporadic use is recommended as a method of self-assessment. There are several different ways in which this can be carried out, usually to the benefit of both or all participants who should meet to discuss discrepancies.

Potential information gained

- a. Assessment of performance relative to a single peer
- b. Rates of discrepancy between individuals

3.5 Use of self-assessment tools

3.5.1 *Electronic self-assessment*

There are several websites available which produce images for self-assessment on the internet, including sites such as Aunt Minnie (www.auntminnie.com).¹⁰ The RCR also publishes a 'case of the month' on its website to which members and Fellows can subscribe (www.rcr.ac.uk). This is a quick and easy method of self-assessment and results can be recorded for the purposes of appraisal.

Potential information gained

- a. Assessment of performance in objective test of diagnostic skills

3.5.2 *Self-assessment of knowledge*

Some journals have the facility to allow multiple choice questions to be answered online, and scores given. It is likely that there will be further development of objective knowledge tests that individuals can take.

Potential information gained

- a. Assessment of performance in objective knowledge test

3.5.3 *Other appraisal tools*

It is likely that self-assessment modules and test film packs will be available for self-assessment in the future. There are already some available, and further development of the Validated Case Archive (VCA)¹¹ may facilitate this. The 'Performs' test available to breast screening radiologists already allows performance to be displayed as a receiver operating characteristic (ROC) curve.

Potential information gained

- a. Assessment of performance in objective test of diagnostic skills
- b. Assessment of performance relative to test population (ROC curve)

3.6 Recording of all documentation relating to performance

For the purposes of appraisal and revalidation, all relevant documents should be available. This should include positive outcomes such as letters of thanks or praise, but all complaints, clinical incidents and legal cases should also be recorded, together with the responses and outcomes.

3.7 Assessment of performance in post

Evidence of adherence to the agreed job plan should be kept, together with record of workload and range of activities undertaken.

3.8 Continuing professional development

Radiologists should record CPD credits in line with RCR guidance.¹² The benefits of these educational activities on everyday practice should be reflected on and reviewed in the annual appraisal interview.

Course organisers may assist in making CPD credits more meaningful by using self-assessment questionnaires at the end of meetings.

4. What to do with the information

All relevant self-assessment information should be kept on file as part of the appraisal process and for future revalidation.

5. What to do if self-assessment reveals a problem or a potential problem

It is your duty to be open and honest about any difficulties or problems which you uncover. The most suitable person to discuss this with is your appraiser. They should be in a position to arrange additional training or experience in areas of difficulty, or direct you to someone who can. They should also be able to indicate where help may be obtained with health, personal or interpersonal problems. Where there is a breakdown in trust between appraiser and appraisee, the medical director should be approached to provide an alternative appraiser. Confiding in a colleague who is a close personal friend may lead to difficulties because of potential divided loyalties, but some trusts have a mentoring system to provide advice under these circumstances. The aim of self-assessment is for all radiologists to be practising to the best of their ability, to identify possible areas for improvement and to enable help and support to be provided where required.

Appendix: definition of terms

1. Accuracy

Accuracy can be expressed through sensitivity and specificity, positive and negative predictive values, or positive and negative diagnostic likelihood ratios.

There is significant debate in the literature about how the accuracy of diagnostic tests should be calculated and reported.^{7,13}

Accuracy in imaging is usually defined by comparison against pathological findings and will combine technical and interpretive accuracy. Reported accuracy may not be directly applicable to local UK practice; for example, where lower specificity equipment is available, or where units are less specialised.¹⁴

The most applicable rates of comparative accuracy for radiological investigations in the UK are probably those found in national audits such as that carried out on barium enema detection of cancer.⁸

2. Error

There is no accepted definition of error in radiology, but the term 'error' is used to denote human error rather than technical shortcomings. Errors may relate to observation, analysis or medical interpretation.

Observational errors or 'missed lesions' are the easiest to identify but the definition of an error versus not seeing a subtle lesion is still open to debate. Even in areas of binary decision (such as 'fracture' or 'no fracture'; and breast cancer: 'yes' or 'no'), the decision as to whether the lesion is visible on an examination may be disputed, as may whether failure to appreciate it constitutes a 'miss'. These issues may be the subject of discussion by experts in a court of law. The more complex the investigation and the wider the range of possible interpretations, the more difficult the definition of error becomes. More difficult to classify, and often not recorded, are errors of overdiagnosis; errors of image analysis in which a finding is detected but analysed incorrectly; or when an abnormality is observed and correctly analysed but its significance and the action required to be taken are not appreciated.

There are as yet no accepted error rates in the literature for radiological interpretation. A clear classification of error and data gathering on a sufficiently large scale may ultimately allow 'normal' error rates to be calculated.

3. Reporting discrepancy

As not all differences in opinion constitute an error, the term 'reporting discrepancy' has been increasingly applied in radiology. Here, two or more people have a different opinion of the observed findings, analysis or medical interpretation of the same investigation. This may constitute what may be agreed as an error on the part of one of the individuals, or it may represent an expert view compared with a generalist's view or just a difference of opinion for which the 'right' answer may never be known. The discrepancy may be the result of one individual having more relevant clinical information. On review of previous images, there is always the risk of hindsight bias when the diagnosis is known.

Radiological discrepancy meetings allow a full, open and unbiased discussion of cases, to debate and identify errors and to learn lessons from them. They may also reveal repeated errors of the same type, highlighting a training need.

4. Inter-observer variation

Two individuals viewing the same image will not necessarily see, or interpret, things in the same way. The more complex the process or image, the larger the inter-observer variation will be. Wide ranges of inter-observer variations are reported in radiology, particularly in complex imaging and where steps requiring significant judgment are necessary.¹⁵ This is not the same as error, although it may be related to differences in knowledge and experience, or unquantifiable qualities such as 'judgment' and some observers' interpretation may constitute 'error'.

5. ROC curves

Receiver operating characteristic (ROC) curves plot the sensitivity of a test versus its false-positive rate for various points (definitely present, probably present to definitely absent) and is especially applicable when test results are interpreted subjectively. Using standardised films in which the final diagnosis is known, an individual's score can be placed on the plot to show their individual performance relative to others who have undertaken the same test. This is the basis of the 'Performs' tests undertaken by breast screening radiologists. There is no pass or fail mark, but outliers may be identified on the graph. Other tests are in development that may allow this technique to be more widely available. It is not perfect, in that it is not a 'real-life' performance, but it may be helpful as a quality control technique as well as a personal performance indicator.

Inter-observer variation is inevitable and can be shown on ROC curves derived from standardised test films.

6. Normal distribution

All human attributes or activity show some form of bell curve or normal distribution, with the minority of individuals being at the ends of the curve. The position of an individual on the curve will vary over time (intra-observer variation), but at the extreme ends of the curve, there are likely to be specific reasons for low or high performance, in line with Shewhart's theory of common cause and special cause variation.^{16,17}

7. Intra-observer variation

Any individual can see the same image on separate occasions and interpret it differently. Intra-observer variation cannot be avoided and will result from many different factors including external and internal factors. External factors may include poor or good working or viewing conditions, or interruption. Examples of internal factors include state of mind and level of alertness. Any sampling of an individual's work over a limited time period will give information on their performance at that time and may be prone to statistical sampling error.

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