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### Teleradiology: Measuring Quality Aspects

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#### Key Points

- Radiology report quality is integral to patient care;
- Standards of radiology report quality must be defined;
- Teleradiology and local radiology should be measured using the same qualitative standards;
- Both referring doctors and patients are important in measuring quality.

#### Introduction

Radiology today is integral to modern day patient care. Most patients will have some form of images or scans taken for a diagnosis to be confirmed or excluded. However, patients often do not really know that there are doctors who are qualified in image interpretation, ie radiologists who review the scan images and issue a report. Radiology reports are a type of medical record, which is formal communication between the referring doctor and the radiologist.

Radiology reports are opinions expressed based on the findings on medical images, clinical history provided on the request card, review of previous images and blood/pathology results available to radiologists. Radiologists also provide recommendations about further management of the patient when appropriate, including further investigations or referral to another specialty. Radiology reporting is performed by medically qualified personnel and is regarded as a “medical act” in many countries. Both referring doctors and patients should evaluate the quality of radiology reporting services.

Teleradiology means distant reporting, ie radiologists who are remote from where the images were originally acquired. Measuring quality aspects of teleradiology should be identical to those used for assessment of the local radiology services.

#### Radiology Report Quality Expectations

Requesting doctors expect the following content within a radiology report:

- a. The clinical question put on the request card should be answered.
- b. Language and terminology used by the reporter should be clear and understandable by the report reader (the reporter should remain mindful of the specialisation and language of person who will read the report).
- c. When an abnormality is detected on the images, the following must be provided:
  - i. A tentative radiological diagnosis (or differential diagnosis);
  - ii. Advice on further investigations — radiology or non-radiological or follow-up examinations should be included—to achieve a definitive diagnosis;
  - iii. Advice on further management/referral to a different speciality where appropriate, based on local set-up of clinical services (the reporting radiologist must understand the local services).
- d. Requesting doctors want reports presented in a logical manner, with report contents structured in a familiar format that can be easily read.

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Subheadings should include clinical history, findings, conclusion, and advice.

- e. Unexpected findings should be highlighted and critical findings should be communicated by telephone call.
- f. The contact telephone number of the radiologist should be included.

Jan Bosmans and his colleagues reflect on radiology reports in the large COVER study, Clinicians' Opinions, Views, and Expectations Concerning the Radiology Report (COVER) (Keen 2011).

#### Professional Dialogue Between Doctors

Modern medicine is very fragmented due to high specialisation. Clinical sub-specialisation itself improves provision of quality of service delivered by an organisation. However, care fragmentation is an inevitable side effect of sub-specialisation. Good communication between professionals is critical to high quality integrated care to the patient as an individual. This is fairly evident in the success of multidisciplinary team meetings (MDTMs) in improving the quality of cancer care in the UK. Below are the types of communication between human beings living in a modern world:

- a. Face to face discussions (e.g. MDTMs);
- b. Video conferencing (e.g. MDTMs);
- c. Audio dialogue (telephone);
- d. Digital dialogue based written communication— email, text etc.;
- e. Written communication (does not support a natural two way dialogue).

On the one hand face to face communication is the best form of communication as it is aided by facial and verbal emotions and emphasis. On the other hand written communication is important to ensure that a long term record is maintained.

When we analyse the majority of radiology reporting, we find that it falls into the worst form of written communication, which does not encourage a natural two way dialogue. There can be misunderstanding of the written report, which can delay and be detrimental to patient management. It is vital that radiologists and referrers are not limited to a one way written communication. Hence, radiology report communication must be supplemented by two way dialogue such as face-to-face (e.g. MDTM) and audio (e.g. phone call) communications. It is often said that a radiology report should be considered to be an invitation to a verbal dialogue. Hence, it is vital that the phone number of the reporting radiologist is included in the report.

#### Access to Investigation Results

Modern medicine is very dependent on supporting investigations such as blood tests, microscopy, cytology/histology, endoscopy etc. For radiologists to make good and accurate tentative and differential diagnoses, they must have access to recent investigation results with one mouse click or less. Without access to supporting information, radiologists are more likely to be non-committal and provide an ambiguous report with a large number of irrelevant differential diagnoses. Clinical radiologists working in MDTMs do recognise the importance of blood tests, microscopy, cytology/ histology and the role it plays in improving diagnostic acumen. Large irrelevant differential diagnoses can be confusing for the referring doctor and delay patient management due to unnecessary tests.

#### Radiology Report Quality Dependencies

The quality of radiology reports is dependent on many factors. These include:

##### a. Qualifications and Training of the Reporter

Medically qualified doctors with further qualifications in radiology image interpretation, ie radiologists, normally provide radiology reports. Medical qualifications are important for understanding disease processes and patient management. Postgraduate training and qualifications to become a radiologist require multi-modality and multi-speciality training in image interpretation. This is important for reporters to understand the correct imaging procedures for the clinical conditions. Skill mix is the term used to define non-medically qualified staff issuing radiology reports. Non-medically qualified reporters are limited in their knowledge of disease processes, and their ability to interpret blood tests and histopathology reports. Often they are unable to provide a robust tentative and differential diagnosis. Mechanisms like double reporting, and team working with radiologists should be in place to ensure that the quality to patients is not compromised by skill mix.

##### b. Radiologists with Special Interests (Working in Clinical Teams)

With the increasing complexity of modern medicine sub-specialisation has been happening in all fields of medicine. Increasingly radiologists work in clinical/ multidisciplinary teams with physicians and surgeons, including breast, gastrointestinal, chest, gynaecology, ENT (ear, nose and throat), urology, haemato-oncology etc. Whilst sub-specialisation can lead to fragmentation of care for an individual patient, team working through participation in weekly multidisciplinary meetings with frontline doctors ensures that patients get personalised care by a team of doctors



(including radiologists and referring doctors). This also ensures that radiologists remain aware of how patients are managed in the speciality, and they retain their clinical focus. This is reflected in their ability to report appropriately, providing suitable advice on management and further investigations.

Multidisciplinary team working allows radiologists to get feedback from their reports, which is essential for maintaining their own quality. Clinical team working is critical to safe and qualitative radiological practice. Through clinical team working, radiologists are aware of how patients are managed, and thus are able to advise on the next step in the management of patients.

#### **c. Access to Clinical Information**

This is critical for radiologists' ability to give good quality reports. The required information includes the following:

- i. A well written request card/letter, which provides a summary of the patient's clinical history and asks the clinical question, is absolutely essential for a reporting radiologist. If the clinical information is inadequate, the radiologist should be able to contact the referring doctor with ease by a phone call or electronic communication.
- ii. Previous imaging history: previous radiological images and reports must be available to a reporting radiologist on the PACS used for reporting.
- iii. Access to recent blood tests, histopathology, endoscopy, microscopy etc. must be available via a single mouse click from RIS/PACS.
- iv: The radiologist must also have access to previous clinical history, such as hospital discharge letters, clinic referral or review letters, operation notes etc. with one mouse click.

#### **d. Involvement in the Image Acquisition**

Technicians or radiographers are mostly responsible for acquiring the images, whilst radiologists issue the radiology report. Radiologists need to ensure that the scan protocols used by the technical staff are robust enough to allow them to deliver a high quality report. They must be able to have a dialogue (face-to-face or via telephone,) and suggest any additional sequences for MRI or additional scans (contrast enhancement for CT) etc. That may be required in individual cases. This is important for radiologists to enable them to issue a high quality report, rather than ambiguous and non-committal reports blaming inadequate technical acquisition.

### **Measuring Radiology Reporting Quality by Referring Doctors**

Quality measures by referring doctors have two aspects. The first is the quality of individual reports. The second is the quality of the reporting service. It is important that standards or measures for radiology reports or a reporting service apply to both teleradiology and local radiology.

#### **Objective Measures of Radiology Report Quality**

This can be obtained by one of the following:

1. A questionnaire sent to referring doctors along with each report;
2. Audits of reports conducted by independent auditors (which should include a radiologist and a referring doctor).

#### **1. Radiology Report Evaluation Questionnaire**

Simple questionnaires containing the following six questions can be used for assessment of radiology report quality:

- a. Can the report be read and understood in isolation—without images?
- b. Are the language and terms used understandable by the referring doctor?
- c. Does the report answer the clinical question?
- d. If an abnormality is seen, does the report give a tentative or differential diagnosis?
- e. If an abnormality is seen, is there advice on appropriate further investigations for a definitive diagnosis?
- f. If an abnormality is seen, is appropriate advice (appropriate for the local clinical practice) on further management or referral to a different speciality given?

#### **2. Radiology Reporting Service Evaluation**

Audits should include evaluation of the following:

- a. Is the referring doctor able to contact the reporting radiologist with ease to discuss a report? If yes, how long would it take to make the contact?



- b. Are unexpected or critical reports communicated verbally to the referring team?
- c. How long did it take for the report to be available to the referring doctors from the time the images were taken?
- d. Is the patient provided with a copy of the report?

#### **Measuring Radiology Reporting Quality by Patients**

Radiologists remain invisible to patients. However, a high quality radiology report supplemented by a two way dialogue between a radiologist and a referring doctor is the cornerstone of high quality diagnostic care for patients. Unless the patients themselves demand high quality of radiology, there will be little desire from radiology service providers to deliver quality, especially in times where cost is an important criterion and cheapest is considered best. The following eight questions should be asked by patients for them to evaluate a radiology reporting service:

1. Will I be given my radiology report if I ask for it?
2. Will I be able to discuss my report with the radiologist, if I wish to?
3. Will the doctor who has referred me be able to discuss the exam easily with the radiologist who is reporting my exam?
4. Does the radiologist reporting my exam work in a clinical team, which deals with my type of problem?
5. Does my radiologist work in a radiological team, where he/she can refer to the appropriate clinical radiologist, if required?
6. Will my radiologist have easy access to my blood tests and other relevant information?
7. When will my report be available after the scan is done?
8. Will my radiologist(s) be working with the technical staff to ensure that the scans are correctly taken?

#### **Conclusion**

With technological advances, it is no longer necessary for radiologists to be based in the same geographical area as the patient to issue a radiology report. There is increasing use of teleradiology. However, it is important that quality of patient care is not compromised and that any radiology reporting service – local or distant (teleradiology) is measured using the same standards.

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