Training in radiological reporting: how is it done in the postgraduate program at Universidad Pontificia Bolivariana, Medellín, Colombia?

Entrenamiento en informe radiológico: ¿cómo se hace en el posgrado de la Universidad Pontificia Bolivariana, Medellín, Colombia?

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Summary
The radiological report is the foundation of diagnostic radiology. Informal conversations with teachers and residents of different cities leave the author with the opinion that their learning is based, most of the time, on the observation of how teachers and older residents do. This article reviews the evolution of the radiological report, the guidelines that exist, the ways to assess the quality of a report and describes how a report workshop is done in the radiology postgraduate program of the Universidad Pontificia Bolivariana, Medellín, Colombia.

Resumen
El informe radiológico es el fundamento de la radiología diagnóstica. Conversaciones informales con profesores y residentes de diferentes ciudades dejan al autor la opinión de que su aprendizaje se basa, en la mayoría de las veces, en la observación de cómo lo hacen los profesores y residentes mayores. En este artículo se revisa la evolución del informe radiológico, de las guías que hay, de las formas de evaluar la calidad de un informe y se describe la manera de ejecutar un taller de informe en el Posgrado de Radiología de la Universidad Pontificia Bolivariana de Medellín, Colombia.

Introduction

The radiology report is the foundation of diagnostic radiology (1–5). The report encapsulates all of the radiologist's training and research. A patient derives no benefit if the radiologist's experience and knowledge are not clearly expressed in a report or if the report is not timely. Communication is the purpose of the report, and it must be effective communication (6–14). "Fundamentally, diagnostic radiology deals with the acquisition, use, and dissemination of information" (2).

In most graduate programs, students learn how to write reports by observing and listening to their professors, without questioning either the methods used or the effectiveness of the communication conveyed in those reports. In some cases, this may even fit one of the definitions of the concept of "hidden curriculum" provided by Centeno et al.: "Unplanned learning that occurs throughout the educational process" (15).

In the author's opinion, graduate programs in radiology are overdue in incorporating academic activities aimed at teaching students how to write reports. Furthermore, each institution should review the guidelines for writing reports, adopt the elements it deems essential, and strive to reach a consensus on the proper way to write reports.

Radiology reports have evolved, and all radiologists must adapt accordingly (10, 16). This article reviews the topic and shares insights into how a report-writing workshop is conducted as part of the Radiology Graduate Program at the Universidad Pontificia Bolivariana in Medellín, Colombia.

Report Progress

Prose reports have been the traditional means by which radiologists have communicated with clinicians and patients. For many years, this format was considered standard practice and did not evolve until the end of the last century, when articles began to appear discussing what such reports should contain and how that content should be presented. The term "tabulated report" came into use and later evolved into "structured report" (8, 12, 13, 17–21).

Beginning in 2000, articles were published comparing the effectiveness of conveying findings between narrative reports and structured reports. Most of these articles favored structured reports. Research was also

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conducted on the preferences of clinicians, who opted for structured reports (18, 20, 22–38).

In 2005, guidelines from various societies began to be published. These guidelines, which will be discussed in the next section, should be required reading for radiology residents (6, 11, 39–43).

In 2018, the European Society of Radiology published its position: the report must be structured, and all radiologists must adopt this reporting format (25). It states that the structured report is a key element in optimizing radiology's contribution to patient outcomes and in ensuring the value of radiologists' work; furthermore, it maintains that standardizing the structure ensures that all relevant areas are addressed. It considers the shift from prose reports to structured reports to be a positive development and believes it should be an international effort. It recommends involving residents in the implementation strategy (25).

Reporting Guidelines

Table 1 lists the six most widely used reporting guidelines and their recommendations regarding what a report should contain. These guidelines and their publication dates are:

- American College of Radiology, published in 2005 and updated in 2014 and 2020 (6).
- Royal College of Radiologists (United Kingdom), published in 2006 and updated in 2018 (11).
- Canadian Association of Radiology, published in 2010 (39).
- European Society of Radiology, published in 2011 (40).
- Royal College of Radiologists of Australia and New Zealand, published in 2013 and updated in 2019 (41, 43).
- Hong Kong College of Radiologists, published in 2021 (42).

A comparison of these can be found in the article by Farmer et al. (44).

The Hong Kong guideline (42) is a guide to good medical practice for radiologists that covers legal, general, and licensing issues; Section 5 describes the criteria for a good report without delving into its content. The other five guidelines agree on most points. The main difference lies in normal findings: three guidelines (11, 40, 43) recommend including them, while the other three (6, 39, 42) do not recommend it or only suggest including them if the absence of abnormality influences the diagnosis, or is part of the severity of the disease, if knowing the negative results is useful for the patient's clinical condition, and when the report is structured. In the author's opinion, they can be omitted for the sake of conciseness.

Additional actions refer to forms of communication other than the report, such as phone calls, in-person conversations, or text messages when required—for example, urgent or incidental findings that require prioritization of care. The recommendation to document that these additional actions were taken is explicitly stated in five of the guidelines (6, 11, 39, 40, 42). From a medico-legal standpoint, what is not written down is considered not to have been done.

It should be noted that five of the guidelines (6, 11, 39, 40, 43) recommend including clinical data and the answer to the clinical question. One way to understand this is to say that they agree that the report should be patient centered.

All six guidelines suggest including recommendations, but they emphasize that these must be justified and based on the expected benefit to the patient.

Table 1. Reporting Guidelines and Suggested Content for Review Articles

Content	Australia and New Zealand	United Kingdom	ACR	Canada	European	Hong Kong
Demographic data	Yes	Yes	Yes	Yes		
Report status	Yes	Yes	Yes	Yes		
History and clinical information	Yes	Yes	Yes	Yes	Yes	
Comparison with previous studies	Yes	Yes	Yes	Yes	Yes	
Technique	Yes	Yes	Yes	Yes	Yes	
Description of the procedure	Yes	Yes	Yes	Yes	Yes	
Quality of the examination	Yes	Yes	Yes	Yes	Yes	
Abnormal findings	Yes	Yes	Yes	Yes	Yes	
Normal findings	Yes	Yes			Yes	
Answer to the clinical question	Yes	Yes	Yes	Yes	Yes	
Differential diagnoses	Yes	Yes	Yes	Yes	Yes	
Conclusion (may also be called opinion or impression)	Yes	Yes	Yes	Yes	Yes	
Recommendations	Yes	Yes	Yes	Yes	Yes	Yes
Document discrepancies	Yes		Yes	Yes		
Document follow-up actions		Yes	Yes	Yes	Yes	Yes

How to Evaluate the Quality of a Report

Numerous methods for evaluating the quality of a report have been described (32, 45–47). Of these, there are two that the author considers essential.

The first is based on the Royal College of Radiologists in the United Kingdom. They published an audit they conducted in 2007 and 2008 on 7,208 reports (45). To conduct this audit, they designed a 6-question questionnaire covering 6 fundamental aspects of the report (Table 2). Of these, the author considers the first—"Was the clinical question answered?"—to be the most important because it requires the radiologist to know why the study was performed. Heilman puts it very well in his article (48): "Strict adherence to the question-answer format will correct the confusion and ambiguity that currently characterize the radiology report," and Friedman states (8): "It is appropriate to assure the clinician that you were attentive to their question."

Table 2. Questionnaire from the Royal College of Radiologists (UK) on Reports

Question 1	Was the clinical question answered?
Question 2	Was a tentative or differential diagnosis provided for the described abnormality?
Question 3	When recommendations were made, were they appropriate?
Question 4	Was the report written in a style appropriate for a general practitioner?
Question 5	Was appropriate action taken and documented when the finding was urgent or unexpected?
Question 6	Was the title of the person reporting clearly stated in the report?

Source: Pool and Siemienowicz (43).

The second method for evaluating the quality of a report recommended by the author was described in 2006 by Robert et al. (47). They operate on the principle that a good report should advance the patient along a four-stage clinical spectrum they designed (Table 3). If the patient presents with signs and symptoms ("position 1"), the report should advance the patient to the "differential diagnoses" or "diagnosis" position. If the patient already has a diagnosis, the report should document the progression, stability, or resolution of the disease. If the study is to assess the position of a device or tube, the report should clearly document the position of its distal end. Thus, the questions the report must answer depend on the patient's position on this clinical spectrum. This is part of patient-centered radiology (49). In the article "Radiology in the Era of Value-Based Healthcare" (2) by Brady et al., there are three statements that reinforce this approach to evaluating report quality:

- "Patients do not want an ultrasound, CT scan, or MRI; they want an answer to a clinical question."
- "The primary purpose of radiology is to answer clinical questions using medical images and to help guide patient care as effectively as possible—including, in some cases, deciding not to perform an imaging test."
- "Fundamentally, diagnostic radiology deals with the acquisition, use, and dissemination of information."

Table 3. Clinical spectrum developed by Robert et al. (47)

Position	Definition
1) Signs and symptoms	The patient presents with symptoms, and the radiological study is intended to identify a diagnosis or possible diagnoses
2) Differential diagnosis	The patient presents with a previously detected abnormality, and the radiological study is intended to distinguish among differential diagnoses
3) Diagnosis	The patient presents with a diagnosis, and the radiological study is intended to determine whether the condition has progressed, remained stable, or resolved
4) Change in condition	The study is intended to determine whether the disease or treatment-related complications have progressed, regressed, or remained stable

How Is the Report Workshop Conducted in the Graduate Program at the Pontificia Bolivariana University?

The report workshop is an academic activity designed to address a weakness identified in the graduate program's assessment process. It is a cross-cutting activity that spans the program's various levels of study; it is held once a week and lasts an average of one hour. It consists of three parts: case reports, journal articles, and peer review of radiological reports.

Case Reports

The expected learning outcomes (ELOs) for this section are:

- Describe radiological findings using appropriate terminology.
- Write reports that include the components common to the reporting guidelines described previously.
- Become accustomed to answering the clinician's questions.

The workshop coordinator selects and sends the case one week in advance. On the day of the workshop, the reports written by the residents are presented anonymously. They are analyzed and discussed by the entire group to identify errors and strengths in the writing. The author of the report, if they wish, may reveal their identity, explain what they intended to convey, and the group collectively determines whether it was done in the best possible way.

The Article

The RAEs for this section are:

- Use the literature on radiology reporting to support the intended change in reporting practices.
- Critically evaluate radiology reports based on articles.
- Discuss radiology reporting practices in light of the scientific literature.
- Demonstrate that radiology reporting is a subject of study and that there are many aspects of the report that can be analyzed.

This is conducted in the form of a journal club by analyzing an article selected by the coordinator based on questions or weaknesses identified during the workshop. Since the workshop was created in January 2017, more than 130 articles have been reviewed. Searches are conducted in databases, primarily PubMed, and the bibliographies of previously presented articles are also used.

Peer Review of Radiology Reports

The learning objectives for this section are:

- To encourage residents to adopt a critical approach to radiology reports.
- To critically evaluate radiology reports based on the knowledge acquired in the workshop.
- To assess the quality of a radiology report.

Residents are invited to present reports they have identified during their rotation. The report is anonymized and displayed as a slide. The resident presenting the report reads it aloud, explains what stands out to them, what flaws and strengths they identify, why they believe it is important to present it in the workshop, and what can be learned from that report.

Conclusion

Radiology reporting should be a subject of study in radiology residency programs. A reporting workshop that encourages constructive criticism of how residents write their reports and stimulates them to question their own reporting practices is an effective way to achieve this goal.

There are several reporting guidelines that should serve as the foundation for establishing reporting standards. Residents should be familiar with these guidelines and put them into practice.

There are also methods for evaluating the quality of reports. This review proposes two that are simple and easy to implement.

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