Radiology by Nonradiologists: Is Report Documentation Adequate?

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Objective: To determine if the quality of medical imaging reports differs significantly between radiologists and nonradiologists.

Study Design: A retrospective nonblinded review of randomly selected chest and long bone x-ray reports by orthopedists and primary care physicians compared with randomly selected imaging reports generated by radiologists.

Methods: We randomly selected 1 report from each of 50 high self-referring physicians privileged by 2 metropolitan New York area health plans for both bone and joint studies and chest x-rays for a total of 200 reports (50 bone and joint x-rays from each plan and 50 chest x-rays from each plan). We compared them with 50 randomly selected radiologist-generated reports. The reports were evaluated for quality based on the American College of Radiology's *Guideline for Communication: Diagnostic Radiology.* The data were analyzed by the 2-sample *t*-test between proportions at the 95% confidence interval.

Results: Radiologists consistently provided higher-quality medical imaging reports than nonradiologists.

Conclusions: To improve imaging service quality, all providers should be held to the same standards for reporting and communication of results.

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Twenty-first century radiology requires rapid and accurate communication of imaging results. The American College of Radiology's *ACR Practice Guideline for Communication: Diagnostic Radiology* states that every imaging study should have an "official interpretation."[1] The College further defines "official interpretation" as the written report that becomes part of a patient's permanent medical record. The American Medical Association (AMA) supports this position, stating in the *CPT 2004 Physician's Current Procedural Terminology,* "A written report, signed by the interpreting physician, should be an integral part of a radiologic procedure or interpretation."[2] According to Karen Zupko and Associates Inc[3] (a practice management consulting company), the Center for Medicare and Medicaid Services (CMS) applies section 15023 of the Medicare *Carriers Manual* to outpatient radiology services. This regulation requires a written report for payment of professional services. It also distinguishes between an "interpretation and report" and a "review," notation, or comment about the study.[4] Finally, the National Committee for Quality Assurance (NCQA) has general guidelines for keeping good medical records.

In 2002, the Consensus Workgroup on Health Information Capture and Report Generation published their findings and recommendations regarding improvement in healthcare documentation and communication. They identified inadequate, illegible documentation and limited access to the medical record as contributing to medical errors.[5] The group also found that despite the fact that "accurate, accessible, and shareable health information is a well-accepted prerequisite of good health care," inadequacies in documentation practices, accessibility, and shareability are accepted in the United States. They added that these substandard practices compromised "patient safety, public safety, continuity of patient care, healthcare economics, clinical research, and outcomes analysis." They also noted that lack of uniformity of medical records and the use of free text made finding important information difficult and time consuming. The inconsistent terminology used made it difficult to understand the information once located.

During our work in radiology benefits management, we found that the availability of plain film reports was inconsistent when performed at the treating physician's office (self-referral) but consistent when performed at a radiology site. We decided to determine the extent of this problem.

METHODS

Nonradiologist Case Selection

We evaluated the imaging reports of internists and orthopedists privileged by 2 metropolitan New York area health plans to perform chest and long bone and joint x-rays in their offices. We searched our database and identified the 50 physicians who self-referred the most chest

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and bone x-rays for each plan. We then randomly selected 1 case for each physician and requested a copy of the examination report for both bone and joint studies and chest x-rays for a total of 200 reports (50 bone and joint x-rays from each plan and 50 chest x-rays from each plan). After reviewing the responses we noted that radiologists actually generated a few reports, even though the study had been performed in the treating physician's office. We eliminated these reports from our study.

Radiologist Case Selection

Additionally, we randomly selected 50 radiologist-generated reports from those on file in our Quality Management department. These included 22 chest x-rays, 21 bone and joint films, and 7 abdominal films, upper gastrointestinal series, or barium enema examinations.

What Makes a Good Report?

We determined the required elements for a radiology report (**Table 1**) from the *ACR Guideline for Communication: Diagnostic Radiology,* making a few appropriate modifications for this study. The ACR guideline encourages inclusion of the following 4 demographic elements:

- Date of dictation
- Date of transcription
- Patient's date of birth or age
- Patient's sex

Of these factors, we included only the latter 2 elements. Other elements included in the ACR guideline, but not evaluated in our study, are:

- Description of any interventions
- Contrast material administered (including concentration and volume)
- Adverse patient reactions
- Limitations of the study
- Conclusion or impression if the report is short
- Differential diagnosis when appropriate

A board-certified radiologist with more than 25 years' experience interpreting plain films then compared the submitted materials to required elements. The reviewer was not blinded to the specialty of the interpreting physicians. We analyzed the data using a 2-sample *t*-test between proportions at the 95% confidence level ($P < .05$).

Table 1. Requirements for a Radiology Report

Demographics
Patient's name
Unique identifier
Date of service
Patient's date of birth
Patient's sex
Name of examination
Interpreting physician's name
Interpreting physician's signature
Referring physician
Clinical Information
Indication(s) for examination
Views taken
Description of findings
Limitations of exam if applicable*
Impression or conclusion
Suggestions for follow-up if applicable*

*These parameters are important but may not be relevant to every study.
Source: Adapted from Reference 1.

RESULTS

Reports for Analysis

An imaging report accompanied all 50 cases of the radiologists. Of 200 requests for reports from the nonradiologist group we received 163 responses, for a response rate of 81.5%. Of the 163 responses, a radiologist actually read 16, either at a radiology facility or in a nonradiologist's office. We excluded these 16 cases from the study, resulting in 147 cases for review. Of these, 56 (38.1%) had no report as described by the American College of Radiology, although several did include a notation or comment about the study in office notes or in a letter to the referring physician (these were included in the analysis). Another 17 (11.6%) sent a report that was dated after our request for the report or was addressed in a manner indicating that the report might have been generated in response to our request. These 17 cases were retained in the data analysis because we could not accurately determine whether the report existed prior to our request. Therefore, up to 49.7% of the cases may not have had an appropriate report. Seventy four (50.3%) sent a real report (**Table 2**). Nonradiologists failed to use a unique identifier 70% of the time. Handwritten notes or reports were often illegible, resulting in useless documentation. No handwritten notes were found in the radiologists reports.

How the Results Measure Up

Radiologists' reports were consistently better than those of nonradiologists. A statistically significant differ-

ence was noted between the radiologists' reports and those of the nonradiologists for the following categories of demographic data: use of unique identifier number, patient's date of birth, patient sex, and interpreting physician's name and signature. For clinical information the data differed significantly between the radiologists' reports and those of the nonradiologists for the description of the examination, views taken, description of findings, and presence of an impression or conclusion (**Table 3**, **Figure**).

Radiologists did not include the indications for the examination as often as did nonradiologists (46% vs 58%). This information may have been omitted because the requesting physician may have provided the radiologist with inadequate information. When we stratified the nonradiologists' results according to internists or family practitioners and orthopedists, only 14 of 68 (21%) chest x-ray reports from internists or family practitioners included a reason for the examination compared with 67 of 79 (86%) bone and joint x-ray reports from orthopedists, mostly because the orthopedist reports were frequently part of a letter to the referring physician.

Table 2. Results of Combined Chest and Bone X-Ray Reports by Nonradiologists (n=147)*

Criteria	Number (%) Containing
Demographics	
Patient's name	144 (97)
Unique identifier number	44 (30)
Date of service	130 (88)
Patient's date of birth	26 (16)
Patient's sex	50 (31)
Interpreting physician's name	104 (65)
Interpreting physician's signature	27 (17)
Clinical Information	
Indication for examination	81(55)
Description of examination	134 (84)
Views taken	67 (42)
Description of findings	97 (41)
Comparison to old films†	11 (7)
Limitations of examination‡	8 (6)
Impression or conclusion§	75 (47)
Suggestions for follow-up	10 (7)

†This number is not reliable because it is not known how many patients actually had old films.
‡This number should be very low because it reflects good-quality films.
§If a report is extremely short then a conclusion is not mandatory.

DISCUSSION

We designed this study to evaluate the adequacy of medical record documentation, not the films' technical quality or interpretation accuracy. This distinction is important because self-referring physicians perform significantly more x-rays than radiologist-referring physicians and the absence of a good medical record can negatively impact patient care. In 1998, Spettell and colleagues[6] reported that in nonhospital settings nonradiologists performed approximately 67% of chest and spine films and between 78% and 86% of bone and joint films.

Healthcare documentation has come under scrutiny in the last few years. In 2002, a report from the Consensus Workgroup on Health Information Capture and Report Generation indicated that the accuracy and accessibility to healthcare information was compromised in the United States.[5] The report stated that patient safety, public safety, continuity of patient care, healthcare economics, and clinical research and outcomes analyses were all adversely affected by poor documentation and record keeping. This group strongly advocates adoption of electronic medical records that are uniformly structured and designed to be searchable.

Inadequate Imaging Reports Compromise Care

Documentation of an imaging examination is considered to be an important part of a patient's medical record.[7] The American College of Radiology (ACR) has described guidelines for structuring good imaging reports, while the NCQA has general guidelines for medical records maintenance. Both organizations agree that each page of the medical record should include the patient's name, date of service, interpreting physician's name, and the physician's signature (this could be a unique electronic identifier). The Consensus Workgroup on Healthcare Information Capture and Report Generation also recommends the use of a unique patient identifier. A unique identifier allows healthcare providers to differentiate patients with the same name and date of birth.

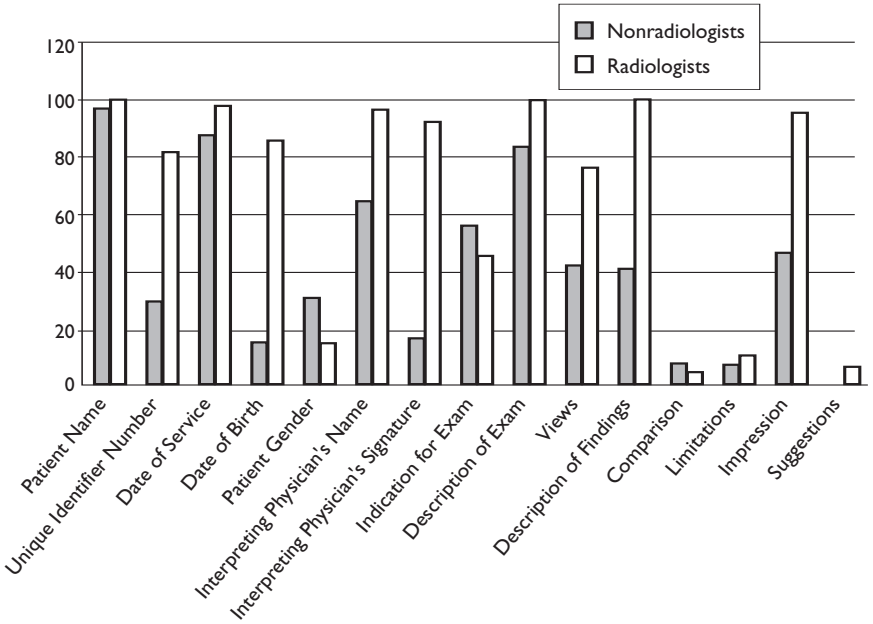
In our study we found myriad documentation errors among records from nonradiologists. The absence of a report or a brief comment about an x-ray in a chart note or in a letter to a referring physician (which happened in up to 49.7% of the cases in the current study in the nonradiologist group) can lead to inadequate communication between healthcare providers. This communication breakdown may result in repeat examinations,

Table 3. Results of X-Ray Reports by Radiologists

Criteria	Number (%) Containing
Demographics	
Patient's name	50 (100)
Unique identifier number	41 (82)
Date of service	49 (98)
Patient's date of birth	43 (86)
Patient's sex	8 (16)
Interpreting physician's name	48 (96)
Interpreting physician's signature	46 (92)
Clinical Information	
Indication for examination	23 (46)
Description of examination	50 (100)
Views taken	38 (76)
Description of findings	50 (100)
Comparison to old films*	2 (4)
Limitations of examination†	4 (8)
Impression or conclusion‡	47 (94)
Suggestions for follow-up	0 (0)

*This number is not reliable because it is not known how many patients actually had old films.
†This number should be very low because it reflects good-quality films.
‡If a report is extremely short then a conclusion is not mandatory.

Figure. Comparison Between Radiologist- and Nonradiologist-generated Reports



which increase costs, expose patients to unnecessary radiation, and may potentially delay patient care. Failure to describe the findings or to include an appropriate impression or differential diagnosis limits the examination's value to other providers. The use of excessively short notations in a record or letter often makes locating or interpreting the results difficult when another provider, healthcare facility, or health plan requests information about a patient.

In 2000, Moskowitz and associates[8] reported similar observations in their review of nonradiologists' imaging reports. In their study 62% of the offices evaluated did not issue a formal radiology report. At many of these sites "a note was made in the chart cryptically stating that a radiograph was either positive or negative." Another study of chest x-rays performed by Pennsylvania's Blue Shield found 21 of 98 reports to be incomplete.[9]

The current study also demonstrated that although radiologists' reports more consistently complied with national recommendations, there is room for improvement, especially in documenting the reason for the examination.

In addition to these issues concerning good patient care, legal issues exist regarding medical record documentation and the matter of reimbursement. As stated previously, the CMS indicates that all imaging studies should include a written report, and the AMA further suggests that the report be signed by the interpreting physician. Radiology billing is unique in that the reimbursement is divided into professional (identified by modifier -26) and technical (identified by modifier -tc) components or is billed as global (no modifiers and comprises the professional plus technical components). Examinations performed in an office setting are usually billed globally. The professional relative-value units, or work that determines the professional reimbursement, includes not only image interpretation but also report preparation. Failure to pro-

vide a report is not only poor patient care and insufficient record keeping in the event of a lawsuit, but can also lead to claims of fraudulent billing for services, which are incompletely provided. Because reimbursement is the same for chest or bone x-rays regardless of the specialty of the interpreting physician, reporting standards should also be the same.

Study Limitations

One limitation of this study is that we obtained the radiologists' reports from our Quality Management division, rather than randomly requesting them. However, in the course of our normal procedures, radiologists have consistently provided us with a written report.

Future Outlook

In the interest of better patient care and improved communication between healthcare providers, imaging service providers should be required to produce legible x-ray reports that are easily identified. This requirement should be part of a health plan's privileging program. Additionally, we recommend that health plans define the report's essential elements, including patient identification requirements. Furthermore, we suggest that the American College of Radiology's guideline for communication be adopted and that all imaging service providers be held to this national standard.

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