

# Addenda to the Radiology Report: What Are We Trying to Convey?

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**Purpose:** The aims of this paper are to describe addenda to radiology reports and to discuss the communication gaps in radiology addenda reaching referring physicians. The authors examine impediments to compliance with an addendum policy and suggest possible solutions.

**Methods:** A total of 62,500 radiology reports were reviewed to analyze the occurrence of report addenda. Addenda types were separated into clinical, generated by radiologists, and administrative (for billing or regulatory reasons). Two radiologists reviewed all clinical addenda and classified them as significant or not significant. Significant addenda were further analyzed for various aspects. An e-mail survey was also conducted to assess prevailing practices in academic departments of radiology.

**Results:** There were 1,069 reports with addenda (1.7%). Of these, 575 were generated by radiologists. Forty-nine (8.5%) were for clinically significant errors and 526 (91.5%) were not. Of the 49 significant addenda, 9 (18%) were fully compliant with departmental addendum policies, 27 (55%) were noncompliant, and 13 (27%) were partially compliant. Of the 49 clinically significant addenda, 17 (55%) were dictated within 1 hour and 40 (82%) within 24 hours of the finalized original reports.

**Conclusions:** Poor compliance with an addendum policy was found. The reasons for noncompliance and possible remedies are discussed, with the hope of beginning a dialogue in the radiology literature on the risks of poor communication processes and the benefits of full implementation of well thought-out addendum policies.

**Key Words:** Radiology report, addendum, addendum policy, errors in radiology report, policy compliance

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## INTRODUCTION

Traditionally, a radiologist's report is and should be a final, definitive, actionable result of an imaging study. The interpreting radiologist is the expert, makes an informed judgment on the findings, and renders an opinion as rapidly as possible, and care decisions are made accordingly.

Medical images of a patient are permanent and can be archived, distributed, and displayed and are thus subject to repeated review and reconsideration. As a result, new or changed clinical information or the subsequent discovery of a prior study are all familiar reasons for an interpreting radiologist to issue a revised report (ie, to supply addenda). Increasingly, report documentation and coding of addenda corrections are also being requested by the billing agency/practice manager as a result of the complexity of ultrasound Doppler imaging, 3-D

CT and MR displays and interventional procedure reporting. In many clinical practice environments, it is difficult enough, even in routine cases, to be certain that referring clinicians receive, read, and understand radiology reports. In this sense, an addendum to a radiology report, however legitimate, may become potentially dangerous, damaging, or disruptive, unless managed appropriately.

In this report, we explore the utility of and adherence to a departmental addendum policy by faculty radiologists, make comparisons with prevailing practices in academic departments of radiology, and offer some suggestions for better management of this issue in modern radiologic practice.

## METHODS

The correction of a finalized radiology report is considered an addendum.

We developed and implemented a departmental addendum policy intended to manage addenda to radiology reports. The salient feature of the policy is that addenda are to be issued only for significant new or additional findings. The issuance, communication, and

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**Table 1.** Results of compliance with departmental addendum policy (n = 49)

Attribute	n (%)
Fully compliant	9 (18)
Noncompliant	27 (55)
Partially compliant but communicated by attending radiologist	13 (27)
Synchronous communication	12 (24)

recording of addenda can be done only by an attending radiologist, and addenda prompted by the peer-review process will be issued by the division director after consultation with the risk management department. To improve compliance, the policy was tweaked once before attaining its current form. Six months after the initiation of the addendum policy, we set out to study compliance and the factors, if any, that may impede conformity with the policy, as well as solutions if necessary.

We conducted a word search for *addendum* in our radiology information system. This search yielded 1,069 reports with addenda among 62,500 radiology reports for the 6-week study period between April 1 and May 15, 2010. Mammographic and administrative addenda were excluded. Nearly all addenda made to mammographic reports were after previous studies had been obtained and comparisons made or to include pathologic results after biopsy. Administrative addenda were initiated by administrative staff members for billing or regulatory reasons. The remaining addenda were classified as clinically significant or not clinically significant. Reports with clinically significant addenda were defined as those containing changes in diagnosis that could affect patient management or outcomes, such as fractures or mass lesions. Nonsignificant clinical addenda were related to patient demography, techniques, or records of communication.

Two radiologists (S.H., G.V.) reviewed all clinical addenda to separate significant from nonsignificant addenda and assessed compliance with the policy (Table 1). The time lag between the sign-off of the original reports and the addendum reports was recorded (Table 2).

On the basis of the policy, reports with clinical addenda were considered fully compliant with the addendum policy if they fulfilled these 3 attributes: (1) the addendum was

**Table 3.** Reasons for generating clinically significant addenda

Clinically Significant Finding	n (%)
Acute trauma	17 (35)
Suspected malignancy	13 (27)
Calculi	8 (16)
Venous thrombosis	1 (2)
Aneurysm	10 (20)
Total	49 (100)

communicated to the referring provider synchronously; (2) the addendum was conveyed by the attending radiologist, not a resident; and (3) the time and the name of recipient physician were recorded in the addendum.

Although these attributes were intertwined, addendum reports meeting fewer than all 3 requirements were partially compliant. The reasons for significant addenda are analyzed in Table 3.

To learn about prevailing practices in other academic departments regarding addendum reports, we sent out 175 e-mail surveys to radiology administrators. We received 32 replies. Table 4 compares survey results with our departmental addendum policy.

## RESULTS

In the 6-week study period, 1,069 addendum reports (1.7%) were generated among 62,500 radiology reports. Four hundred ninety-four (46%) were excluded from consideration. These were 118 (11%) mammographic and 376 (35%) administrative addenda. Of the remaining 575 addendum reports, 49 (8.5%) were clinically significant and 526 (91.5%) were not. The 49 reports with significant clinical addenda form the basis of this paper. Data regarding compliance with the departmental addendum policy are provided in Table 1.

Analysis of the time lag between the issuance of the original reports and the addenda appears in Table 2. Of the 175 e-mail surveys sent out, we received 32 replies (18%). Table 4 compares the survey results and our policy.

## DISCUSSION

An addendum to a radiology report may be problematic. The new version may or may not have implications for patient management, may or may not be received and

**Table 2.** Time lag between the original and the addendum reports

Time Delay	Number of Addenda		
	Total	Clinically Nonsignificant	Clinically Significant
<1 hour	245 (44%)	228 (43%)	27 (55%)
1-24 hours	222 (39%)	209 (40%)	13 (27%)
1-7 days	86 (15%)	79 (15%)	7 (14%)
>7 days	12 (2%)	10 (2%)	2 (4%)
Total	575 (100%)	526 (91.5% of total)	49 (8.5% of total)

Note: Administrative addenda (n = 371) are not included in these data.

**Table 4.** Comparison of survey results (n = 32) with departmental addendum policy

Attribute	Survey Result	Departmental Policy
Written policy	17 (53%)	Yes
Addenda can be issued by residents	6 (18%)	No
Verbal communication required	13 (40%)	Yes
Addenda must be communicated synchronously*	None	Yes
Communication record required	None	Yes

\*Phone call or text message with verification.

read by the referring clinician, and will certainly raise the question of whether the revised report truly represents the final word. Our department had incidents in which reports with addenda were late in reaching referring physicians, potentially causing delays in patient management. To address this deficiency in our system, we developed an addendum policy. The purposes of this policy were to reduce the number of reports with addenda and to ensure that communications occurred synchronously and that auditable records of communication were maintained. Before implementation, a consensus on this policy was developed among the leadership and staff of the radiology and emergency departments. To that end, we circulated the new addendum policy in the radiology department with a brief summary of expectations as well as legal and regulatory imperatives for compliance.

Typographic errors occur more commonly than is generally realized by interpreting radiologists, and some may have significant bearing on patient care [1,2]. In the emergency department, a preliminary report by a radiology resident, especially at night, is generally actionable by emergency department physicians. Therefore, any addenda generated at the morning read will require immediate communication. Addenda may also be required when new clinical information becomes available, during a clinical conference or physician consultation, or when a missed radiologic finding may be detected on a follow-up study. Sometimes an addendum is initiated in response to a physician's request for the addition of a pertinent negative finding to the report.

Our policy requires that only an attending radiologist, not a resident, can issue and communicate an addendum. This is intended to help reduce the number of reports with addenda, to ensure appropriate communication, and to lend authenticity to report contents.

Many dictation systems allow radiologists to issue addenda to reports up to 1 hour after sign-off, as long as the report has not been accessed by anyone. Our system, PowerScribe (Nuance, Burlington, Massachusetts) does not have this feature. If it did, we could have avoided about half of all addenda (228 of 526 [43%] of nonsignificant addenda and 27 of 49 [55%] of significant addenda) because these were generated within 60 minutes of the finalization of the original reports. Fewer than

20% of all addenda were generated >24 hours after the original reports. In these cases, it is reasonable to assume that radiologists did not realize their mistakes until they were pointed out to them. It was not clear from the time lag whether interpreting radiologists themselves realized their mistakes or whether someone else pointed out the errors, causing the generation of addenda (Table 2). Radiology reports are beginning to be legally available to patients through HIPAA [3]. Thus, reports are available to patients for scrutiny or to obtain second opinions.

Poor compliance with our addendum policy may be due to several factors. Some are mentioned above. Others are the work habits of radiologists; keeping records of the communication of report addenda had not previously been a part of their work routine. Report generation using voice recognition systems requires concurrent report editing and attention to disease-specific, customized, and structured reporting. This increases workload and requires multitasking [2].

In an effort to increase compliance, we have revised our addendum policy to categorize significant addenda as critical results that must be communicated synchronously, with the name of the recipient and the time and date recorded in the addendum [4].

Analysis of the responses to the e-mail survey of the administrators of academic departments of radiology indicates that there is no consensus on the management of report addenda. None of the departments required keeping permanent records of the communication of addenda. The absence of these records may be risky for radiologists from a medicolegal point of view. We hope that our study will initiate discussion in radiology circles on the important issue of report addendum management.

There were several limitations to this study, chiefly that we sampled only 6 weeks of radiology reports and did not attempt to locate those reports for which necessary addenda were not issued. Further work is necessary to study the effects of interventions on compliance with and achieving the objectives of the addendum policy.

We have attempted to explore the realm of errors in radiology from the perspective of report addenda, discussing their possible causes and effects as well as corrective measures.

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## REFERENCES

1. Quint LE, Quint JD, Myles JD. Frequency and spectrum of errors in final radiology reports generated with automatic speech recognition technology. *J Am Coll Radiol* 2008;5:1196-9.
2. Holman B, Aliabadi P, Silverman S, et al. Medical impact of unedited preliminary radiology reports. *Radiology* 1994;191:519-21.
3. Hall FM. The radiology report of the future. *Radiology* 2009;251:313-6.
4. Hussain S. Communicating critical results in radiology. *J Am Coll Radiol* 2010;7:148-51.