

Reducing Radiology Report Addenda Using Provisionally Signed Status

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INTRODUCTION TO THE PROBLEM WE ADDRESSED

Radiology reports provide effective communication about imaging studies or procedures between interpreting radiologists and the referring clinical providers responsible for patient care. The reports also serve to document, in patients' medical records, the relevant imaging findings and impressions of imaging studies for potential future review. Effective communication inherent to the radiology report should be tailored to satisfy the need for timeliness, support the role of the interpreting physician as a consultant by encouraging physician communication, and minimize the risk for communication errors [1].

When new information about a particular imaging study arises and becomes known to the interpreting radiologist after the radiology report has been signed, an addendum to the original report may be issued. Addenda may convey a wide range of new information not included in the original report, including new findings on the imaging study not originally detected, a newly available comparison study that alters a radiologist's impression or recommendations on the original study, correction of a previous technical descriptor, and much more. It is usually up to the discretion of the original interpreting radiologist whether an addendum is necessary.

Despite serving an important role, addenda can be problematic or even disruptive unless appropriately managed [2]. If an addendum is issued and it conveys a new finding or impression that is of high clinical significance, a new communication

should be made with the provider responsible for the patient's care, which can affect clinical efficiency. Also, addenda issued for nonurgent, administrative, or even technical or billing reasons may be extraneous and add unnecessary or confusing information to the original report. For these reasons, lowering the percentage of addenda to radiology reports should be a goal for an ideal radiology department.

WHAT WE DID TO ADDRESS THE PROBLEM

Through a voice recognition software upgrade, our department recently acquired "provisional signing" capability for our radiology reports. Provisional signing allows the interpreting radiologist to "unsign" a report within a specified time (currently set at 2 min in our department) and to make changes to the original report without having to generate an addendum. We suspect that the provisional signing feature reduces the total number of radiology addenda. In this case study, we evaluated the percentage of radiology addenda after the implementation of provisional signing in our voice recognition software and compared this with previously reported data from the same radiology department, regarding addenda percentage before the implementation of provisional signing [2]. This case study also evaluates the percentage of clinically significant and not significant addenda, the types of findings conveyed in the clinically significant addenda, time between original report and addenda, and adherence

to the departmental communication policy for addenda.

Institutional review board exemption was obtained for this case study. A word search for *addendum* was conducted among our 69,189 radiology reports from September through November 2012 and included addenda to radiology reports from mammography, breast MRI, nuclear cardiology, and reports from a satellite facility. Mammographic and breast MRI reports were excluded because nearly all addenda made to these reports were after previous studies had been obtained and comparisons were made or to include pathologic results after biopsy. Reports from the satellite facility were excluded because these reports were generated by a separate group of radiologists, not under the same practice as the investigators. This search yielded 414 reports with addenda. Four radiologists (3 attending radiologists and 1 postgraduate year 3 radiology resident) reviewed these reports in consensus. The time lags between the sign-off of the original reports and the addendum reports were recorded and categorized as (1) <60 min, (2) 1 to 24 hours, (3) 1 to 7 days, or (4) >7 days. A total of 109 reports with administrative addenda initiated by administrative staff members for billing or regulatory purposes were excluded. The remaining 305 reports with clinical addenda were then categorized as clinically significant or not significant. Reports with clinically significant addenda were defined as those containing changes in diagnosis that could affect patient management or outcomes (eg,

fractures, mass lesions). Nonsignificant clinical addenda were often related to patient demography, technique, typographical errors, or provider-to-provider communications. The findings on clinically significant addenda were recorded. On the basis of the addendum policy, reports with clinical addenda were considered fully compliant and properly communicated if they fulfilled these 3 attributes: (1) the addendum was communicated to the referring provider synchronously; (2) the addendum was conveyed by the attending radiologist, not a trainee (resident or fellow); and (3) the time and the name of recipient provider were recorded in the addendum [3]. Although these attributes were intertwined, addendum reports meeting fewer than all 3 requirements were considered partially compliant.

OUTCOMES

During the case study period, among 69,189 radiology reports, a total of 414 (0.6%) addenda were generated. This represents a 65% reduction in the number of total addenda generated after a 2-min delay period between signing the report in voice recognition and finalizing it in the radiology information system was activated to recall reports in “provisionally signed” status. One hundred nine administrative addenda (26.3%) were excluded from consideration. Of the remaining 305 clinical addenda, 77 (25.2%) were clinically significant and 226 (74.8%) were not. The 77 reports with clinically significant addenda form the basis of this report. Data regarding compliance with the departmental addendum policy are provided in Table 1. Analysis of the time lag between the issuance of the original report and the addenda appears in Table 2. The most common reasons for generating a clinically significant

Table 1. Results of compliance with departmental addendum policy (n = 77)

Attribute	n (%)
Addenda communicated	19 (24.7)
Compliant	15 (19.5)
Noncompliant	58 (75.3)
Partially compliant	4 (5.2)
Partially compliant and recorded by attending radiologist	2 (2.6)
Partially compliant and not recorded by attending radiologist	2 (2.6)

addendum were trauma (22 addenda) and suspected malignancy (18 addenda). A summary of reasons for generating clinically significant addenda is listed in Table 3.

Radiology report addenda allow interpreting radiologists to add information to previously signed reports. A wide variety of information may be conveyed in radiology report addenda, including administrative details, technical details or changes, new clinically insignificant findings, and new clinically significant findings. Reducing the number of radiology report addenda improves patient care by enhancing workflow efficiency, eliminating the need for subsequent provider-to-provider communication, and increasing provider confidence that the original report is the “final word” and therefore represents reliable information on which to base clinical judgment. When an addendum is needed, appropriate management including adherence to accepted standards of communication are essential, particularly

when new, clinically significant findings are the reason for the addendum.

Our voice recognition software (PowerScribe; Nuance, Burlington, Massachusetts) was recently upgraded to include the provisional signing feature. Provisional signature allows the original report to be unsigned within a specified time frame (2 min at our institution), information added or corrected, and the report resigned without the need for an addendum. Before the implementation of provisional signature, our department issued 575 clinical addenda to 62,500 reports (0.92%). At that time, it was predicted that the implementation of provisional signature would reduce the number of clinical addenda to 255, a reduction of 56% [2]. In our case study, the number of clinical addenda was 305 among 69,189 (0.44%), an actual reduction of nearly 48%. After the implementation of provisional signature, the percentage of clinically significant addenda increased from 8.5% (49 of 575) to 25.2% (77 of 305), and the percentage of clinically insignificant addenda decreased from 91.5% (526 of 575) to 74.8% (226 of 305). This case study proved that the implementation of provisional signature helped reduce the total number of clinical addenda as well as the total number and percentage of clinically insignificant addenda. However, there were resultant increases in the total number and percentage of clinically significant addenda.

Table 2. Time lag between the issuance of the original report and addenda

Time Delay	Number of Addenda		
	Total (%)	Clinically Insignificant (%)	Clinically Significant (%)
<1 h	139 (45.6)	106 (46.5)	33 (42.9)
1–24 h	83 (27.2)	60 (26.3)	23 (29.9)
1–7 d	49 (15.7)	33 (14.5)	15 (19.5)
>7 d	35 (11.5)	29 (12.7)	6 (7.8)
Total	305 (100)	228 (74.8 of total)	77 (25.2 of total)

Note: Administrative addenda (n = 111) are not included in these data.

Table 3. Reasons for generating clinically significant addenda

Clinically Significant Finding	n (%)
Trauma	22 (28.6)
Suspected malignancy	18 (23.4)
Interpretive error	6 (7.8)
Vascular thrombosis	6 (7.8)
Infection	5 (6.5)
Vascular disease	5 (6.5)
Interventional/surgical device malfunction	4 (5.2)
Foreign body	2 (2.6)
Obstructive uropathy	2 (2.6)
Appendicitis	1 (1.3)
Fistula	1 (1.3)
Hernia	1 (1.3)
Pleural effusion	1 (1.3)
Pneumonia	1 (1.3)
Pneumothorax	1 (1.3)
Surgical complication	1 (1.3)

The greatest impact of provisional signature is on the reduction of the overall number of clinical addenda, specifically on the number of clinically insignificant addenda. This is particularly beneficial because clinically insignificant addenda most often do not require any change in clinical management. However, all addenda, including clinically insignificant, prompt an additional follow-up report to the ordering clinician. This report is typically extraneous and may even be confusing to the ordering provider, potentially prompting further, ultimately unnecessary, provider-to-radiologist communication.

We found that the total number and percentage of clinically significant addenda increased after the implementation of provisional signature. This fact, along with high likelihood that a clinically significant addendum would alter patient management, requires strict

adherence to a policy that ensures timely communication between the radiologist issuing the addendum and the clinically responsible provider. At times, the clinically responsible provider is different from the provider who originally ordered the study. Unfortunately, our case study showed continued poor compliance with the departmental addendum communication policy and suggests an area for future quality improvement efforts and research.

The percentages of total addenda issued at various times relative to the finalized original report (<60 min, 1–24 hours, 1–7 days, and >7 days) were similar to data from before the implementation of provisional signature. Nevertheless, clinically insignificant addenda showed a distinct reduction in the 1- to 24-hour period (40% before provisional signature to 26.3% after) and an increase in the >7-day period (2% before provisional signature to 12.7% after). Additionally, clinically significant addenda decreased in the <1-hour period (55% before provisional signature to 42.9% after). Radiologists who became immediately aware of clinically significant findings were likely prompted to use the provisional signature feature, accounting for this reduction. Before provisional signature, a radiologist may have delayed “formally” issuing the addendum until a more convenient time despite having already communicated the results to the clinician.

Our case study was limited in several ways. The study period included only 2 months of radiology

reports. We also did not evaluate addenda or changes to reports in preliminary status, which is particularly applicable to “after-hours” resident and nighthawk readings. These preliminary readings can have a significant impact on patient care in the acute setting. Our case study also did not include an in-depth analysis of the causes of poor compliance with the addenda communication policy.

In summary, we evaluated the impact of using the provisional signing option on the generated addenda to radiology reports. The provisional signature option enabled the reduction of the overall number of radiology clinical report addenda, specifically the number of clinically nonsignificant addenda, while the total number and percentage of clinically significant addenda increased. Compliance with our departmental communication policy for addenda was reevaluated and remains low (19.5%). The case study was limited in that included data from only 2 months of radiology reports, and we did not evaluate addenda or changes to reports in preliminary status.

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