WHITE PAPER

Enterprise Imaging

Sectional Reporting

AGFA HealthCare

Showing a similar thing in a similar way

1. Introduction

Effective and efficient communication of results is one of the most critical components of diagnostic and the medical imaging workflow. For some time now, it has been possible to send images over computer networks not only within the radiology department, but in a more widespread distribution to other hospital departments, emergency departments, operating rooms, referring clinicians and even the homes of family physicians. Yet, by whatever means they are distributed, the radiologists' reports will always be the most significant means of communicating their professional diagnoses and/or observations.

According to the American College of Radiologists Practice Guidelines, an effective method of communication 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 of communication errors."[1] To support high quality of care, the correct results must be passed on to the referring or requesting physicians in a timely fashion. The report is viewed as the main collaboration tool between the radiology department and all the other departments that use radiology's services. This means the report must facilitate and improve communication between the parties involved.

Perhaps its most important role, however, is to eliminate communication errors. The daily work demands of the radiologist and the wide distribution of the report itself make a direct discussion with every ordering or referring physician impossible. Therefore, in addition to completeness, "the ease of both reading the report and extracting information from it, its focused and organized structure, and the ability to readily discern what was specifically examined"[2] becomes more important.

As most, if not all, of the communication is driven by the IT system used[3], the exchange of information between the radiologist and the clinician relies on having a system that is capable of providing the necessary structure and uniformity to the radiology report. It has been shown that "tabular reports are preferred to prose, with the combination of a detailed report presented in a tabular format…being the most preferred style."[4]

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[1] ACR Practice Guideline for Communication of Diagnostic Imaging Findings (2010) – Resolution 11, available online at: http://www.acr.org/~/media/C5D1443C9EA4424AA12477D1AD1D927D.pdf (hereinafter referred as ACR Practice Guidelines) .
[2] Naik SS, Hanbidge A, Wilson SR. Radiology reports: examining radiologist and clinician preferences regarding style and content. AJR Am J Roentgenol 2001; 176(3): 591–598
[3] "Communication of information is only as effective as the system that conveys the information." - ACR Practice Guidelines.
[4] A.A.O. Plumb, F.M. Grieve, S.H. Khan. Survey of hospital clinicians' preferences regarding the format of radiology reports. Clinical Radiology, Volume 64, Issue 4, Pages 386-394.

The uniformity and structure provided by sectional reporting offers an efficient alternative to prose.

2. What is Sectional Reporting?

Sectional reporting is the first step towards structured reporting. It is a guideline for naturally and logically grouping various parts of a radiology report. It gives the radiology report shape and structure, while avoiding the limitations of prose reports.[5] While a prose report may use headings that serve a specific purpose (e.g., Findings, Impression, etc), this is often not enforced, and can vary significantly across report creators. Sectional reporting provides the modularity needed not only to use fully structured reporting but also to better standardize reports, drastically improving report turnaround time. Johnson et al., show that sectional reporting has an edge over conventional reporting, and that report modularity is a significant - if not the most important - factor contributing to its success.[6]

To better explain sectional reporting some examples will be helpful. Here is a sample radiology report:

Procedure details
Ultrasound abdomen standard views.

Findings
The examination shows the liver to be small in size and with diffuse heterogenous abnormalities. No ductal dilatation is appreciated. The gallbladder is not distended and no gallstones are evident. The common bile duct measures 5 mm in diameter. The kidneys show no evidence of obstruction and mild thinning of the parenchyma which is compatible with the patient's age. The kidneys measure 10 cm in the length on the right and 10 centimeter in the length on the left. There is prominence to the renal sinus fat bilaterally. There is evidence of ascites.

Conclusion
Liver cirrhosis with ascites.

In this example, the headings, the spacing and the natural flow and ordering make the report easy to read. It also follows the general mental model of most radiologists in terms of creation. This example is indeed very similar to sectional reporting.

However, a radiology report can also look like this:

The examination shows the liver to be small in size and with diffuse heterogenous abnormalities. No ductal dilatation is appreciated. The gallbladder is not distended and no gallstones are evident. The common bile duct measures 5 mm in diameter. My impression is of liver cirrhosis with ascites. The kidneys show no evidence of obstruction and mild thinning of the parenchyma which is compatible with the patient's age. The kidneys measure 10 cm in the length on the right and 10 centimeter in the length on the left. There is prominence to the renal sinus fat bilaterally. There is evidence of ascites. The performed procedure was an ultrasound abdomen standard views.

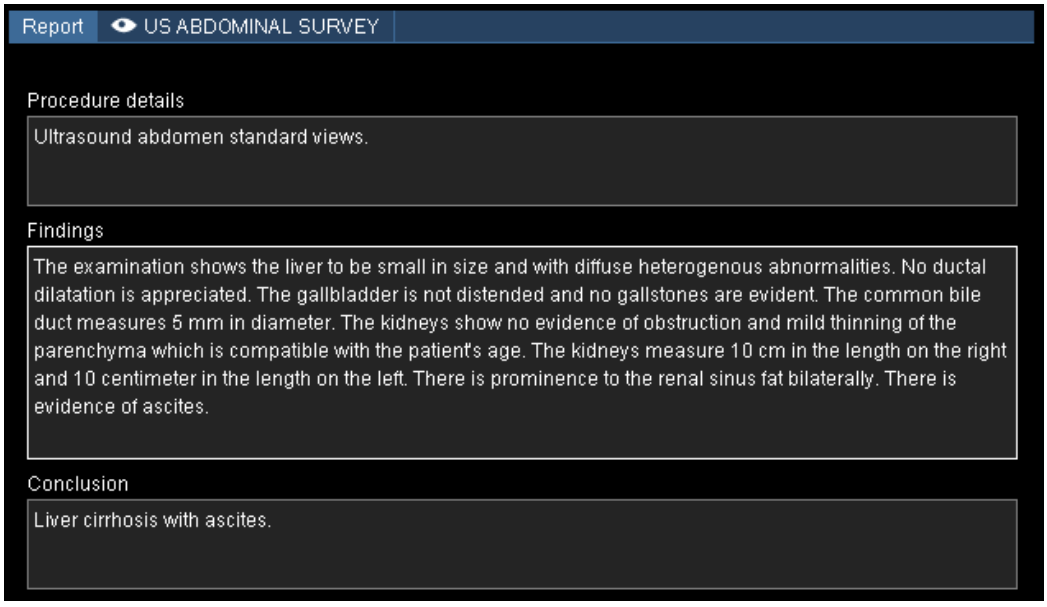
[5] "Prose reports foster a lack of standardization of content among different radiologists." - Naik SS, Hanbidge A, Wilson SR. Radiology reports: examining radiologist and clinician preferences regarding style and content. AJR Am J Roentgenol 2001; 176(3): 591–598.
[6] "First, the reports created by the system were displayed in a modular format, with section headings. Second, the reports contained a consistent ordering of observations." - Johnson AJ, Chen MY, Swan JS, Applegate KE, Littenberg B. Cohort study of structured reporting compared with conventional dictation. Radiology 2009; 253(1):74–80.

In the second example, the structure is lost, and although the radiologist communicates exactly the same information, it is harder to read, simply because there is no control over the headings or the order of information.

The examination shows the liver to be small in size and with diffuse heterogenous abnormalities. No ductal dilatation is appreciated. The gallbladder is not distended and no gallstones are evident. The common bile duct measures 5 mm in diameter. My impression is of liver cirrhosis with ascites. The kidneys show no evidence of obstruction and mild thinning of the parenchyma which is compatible with the patient's age. The kidneys measure 10 cm in the length on the right and 10 centimeter in the length on the left. There is prominence to the renal sinus fat bilaterally. There is evidence of ascites. The performed procedure was an ultrasound abdomen standard views.

The clinician will have a harder time decoding it. The lack of standardization can also be an impediment to data mining and extraction.

2.1 Sectional reporting helps by providing the required guidance:



"Sections" are defined fragments of a report that serve a specific purpose in the clinical workflow or medical decision process. Sections can refer to procedural details, radiologist findings, conclusions, impressions, recommendations, and so on. Sections can also be dedicated to image quality, to comparison study review, to image measurements or to specific reporting workflows. In all cases, they are sorted and presented consistently. This predictability and precise definition of a section allows content to be predefined and automatically inserted; likewise, data can be easily extracted retroactively.

A report structure is a combination of sections; it can be defined on any configuration level ranging from the enterprise level to a specific procedure definition. The report structure is used in addition to the report template, which gives a finished look to the final report. This distinction between presentation (report template, report layout) and content (section content) saves time by helping the reporting radiologist focus solely on the content, rather than on the report layout or appearance. Furthermore, navigation between sections is straightforward, particularly when using speech recognition, and involves less user interaction compared to heading creation or navigation. Report sections can be defined as mandatory, effectively transforming report content guidance into content requirements.

Sectional reporting requires some changes in user practices, but as with the introduction of speech recognition, these changes result in significant improvements in reporting.[7] Sectional reporting also has the flexibility to accommodate prose reports by setting up a single section. This high level of configurability allows it to be presented as an option to accommodate individual user preferences or during a transitional period. However, this prose report format will lack some of the important advantages of the sectional reporting.

3. Why Sectional Reporting

The ultimate goal of any medical IT system is to improve the delivery of care. Report completeness and consistency are generally evaluated within this context. Higher quality of care delivery, however, also demands a shorter report turnaround time and faster medical decision making. It is important to remember that radiology is a service used by other clinical specialties, including general practice. With the exception of interventional radiology, a report created after a radiological examination is rarely used by its creator. Instead, it is likely to be used by clinicians and general practitioners. Their opinion of the effectiveness and quality of the reports is an important consideration. Clinicians and general practitioners are interested in efficient and effective diagnostic data gathering, as well as diagnostic data analysis and statistics, for patient care, research and administration. Similarly, while radiologists in academic institutions often consider sectional reporting, this has perhaps been less the case outside of academic institutions, where research is less frequent or important. Radiologists are now being held more responsible for creating better reports to help clinicians and general practitioners increase the quality of the care that they deliver.[8]
In the face of this demand, the IT system used has to adapt to ensure the radiologist can provide sectional reports at the same or similar costs as prose reports.

[7] Quint DJ. Voice-recognition: ready for prime time? J Am Coll Radiol 2007; 4(10): 667–669
[8] Reiner BI, Knight N, Siegel EL. Radiology reporting, past, present, and future: the radiologist's perspective. J Am Coll Radiol 2007; 4(5): 313–319.

For some time, it has been known that there is a need to divide up a report for clearer communication.[9] Some of the advantages of sectional reporting are report appearance, completeness, legibility and structure.

Naik et al. demonstrate that providing dedicated report fragments specifically indicating "the study, the scan quality, comparison studies, and the radiologist's opinion can result in more consistent inclusion of all relevant data."[10] Furthermore, it has been shown that prose reports suffer from significant inconsistencies, and frequently leave out essential information such as clinical indication, comparison studies analysis and the radiologist's impressions. Sectional reporting will help correct this, resulting not only in the faster creation of reports, but also in more comprehensive reports.

4. Summary

Report sections are uniquely identifiable fragments of a report defined to serve a specific purpose in the clinical workflow or medical decision process. Sectional reporting increases the reporting consistency, predictability and completeness (both in terms of content and timing) and, ultimately, decreases report turnaround time. The overall result is higher quality of care delivery. Furthermore, sectional reporting makes it easier for clinicians and general practitioners to read the report and to extract the information they need for research or statistical purposes. In essence, sectional reporting makes it possible to show a similar thing in a similar way.

[9] "...any report over two sentences long requires a separate impression. To reduce the inevitable difficulty in deciphering a complex list of findings and changes requires a summary statement" - Friedman PJ. Radiologic reporting: structure. AJR 1983; 140: 171 -172.
[10] Naik SS, Hanbidge A, Wilson SR. Radiology reports: examining radiologist and clinician preferences regarding style and content. AJR Am J Roentgenol 2001; 176(3): 591–598.

Agfa HealthCare, a member of the Agfa-Gevaert Group, is a leading global provider of diagnostic imaging and healthcare IT solutions. The company has nearly a century of healthcare experience and has been a pioneer on the healthcare IT market since the early 1990's. Today Agfa HealthCare designs, develops and delivers state-of-the-art systems for capturing, managing and processing diagnostic images and clinical/administrative information for hospitals and healthcare facilities, as well as contrast media solutions to enable effective medical imaging results.

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