Special Review

Structured Reporting in Radiology

Dhakshinamoorthy Ganeshan, MD, Phuong-Anh Thi Duong, MD, Linda Probyn, MD, Leon Lenchik, MD, Tatum A. McArthur, MD, Michele Retrouvey, MD, Emily H. Ghobadi, MD, Stephane L. Desouches, DO, David Pastel, MD, Isaac R. Francis, MBBS

Radiology reports are vital for patient care as referring physicians depend upon them for deciding appropriate patient management. Traditional narrative reports are associated with excessive variability in the language, length, and style, which can minimize report clarity and make it difficult for referring clinicians to identify key information needed for patient care. Structured reporting has been advocated as a potential solution for improving the quality of radiology reports. The Association of University Radiologists—Radiology Research Alliance Structured Reporting Task Force convened to explore the current and future role of structured reporting in radiology and summarized its finding in this article. We review the advantages and disadvantages of structured radiology reports and discuss the current prevailing sentiments among radiologists regarding structured reports. We also discuss the obstacles to the use of structured reports and highlight ways to overcome some of those challenges. We also discuss the future directions in radiology reporting in the era of personalized medicine.

Key Words: Radiology; structured reports; patient care; research; patient-centered radiology.

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INTRODUCTION

The radiology report is vital for patient management. Radiologists play a major role in patient care by the accurate interpretation of imaging studies and appropriate communication of imaging findings to referring physicians. Although some referring clinicians may interpret imaging studies by themselves, radiologists' reports have been shown to be more accurate and comprehensive, resulting in improved patient care (1–5). To improve patient care, it is imperative for the reports to be timely and accurate and to answer the clinical question. For a health-care system, these may be the most important, readily available metrics by which the value of radiology service could be measured.

Although learning how to report imaging studies is an essential component of radiology residency training programs, formal training on how to frame a radiology report often receives less than 1 hour/year (6). Instead, most trainees learn the art of reporting by observing faculty, senior residents, fellows, and peers.

Traditionally, radiology reports were created using free-text, narrative language. Studies show that the use of nonstructured reports using narrative language may serve as an obstacle to optimal patient care. Excessive variability in language, length, and style can minimize report clarity, making it difficult for referring physicians to identify key information needed for patient care (7–10).

Structured reporting has been advocated as a potential solution for improving the quality of radiology reports. A tiered approach to structured reporting has been described (7,11–13). At its basic level, a structured report should be organized with headings, such as clinical history, indication, technique, findings, and impression (Fig 1). The next tier of structured reports is where the "findings" section is organized with subheadings, such as the various organs (or anatomic structures) imaged (Fig 2). At the highest tier, the structured radiology report has all of the previously mentioned characteristics and uses a standardized language based on a universally accepted lexicon (Fig 3). Increasingly, academic centers are using structured radiology reports containing templates, macros, or prepopulated checklists.

The Association of University Radiologists—Radiology Research Alliance convened a task force to review the current status of structured reports in radiology. In the present article,

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From the Department of Diagnostic Radiology, University of Texas MD Anderson Cancer Center, Pickens Academic Tower, 1400 Pressler Street, Unit 1473, Houston, TX 77030-4009 (D.G.); Department of Radiology and Imaging Sciences Diagnostic Radiology, Emory University, Atlanta, Georgia (P.-A.T.D.); Postgraduate Medical Education, Admissions and Evaluation, Sunnybrook Health Sciences Centre, Education, Department of Medical Imaging, University of Toronto, Toronto, Ontario, Canada (L.P.); Department of Radiology, Wake Forest School of Medicine, Winston-Salem, North Carolina (L.L.); Department of Diagnostic Radiology, Musculoskeletal Imaging, The University of Colorado, Denver, Colorado (T.A.MA.); Department of Radiology, Eastern Virginia Medical School, Norfolk, Virginia (M.R.); Department of Radiology, Northwestern Memorial Hospital, Chicago, Illinois (E.H.G.); Department of Radiology, University of Missouri Kansas City School of Medicine, Kansas City, Missouri (S.L.D.); Radiology and Neurology, Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire (D.P.); Department of Radiology, University of Michigan Hospitals, Ann Arbor, Michigan (I.R.F.). Received May 31, 2017; revised August 2, 2017; accepted August 3, 2017. Submission declaration: All the authors confirm that this manuscript has not been published previously, and that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere including electronically in the same form, in English or in any other language, without the written consent of the copyright holder. Compliance with ethical standards: All the authors confirm that this manuscript complies with ethical standards. Dhakshinamoorthy Ganeshan was supported by P30 Cancer Center Support Grant No. NIH/NCI P30 CA016672 from the National Cancer Institute, National Institutes of Health. **Address correspondence to:** D.G. e-mail: dganeshan@mdanderson.org

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FULL RESULT:

Examination: CT chest abdomen and pelvis

Clinical History: Renal cell carcinoma

Indication: Restaging

Comparison: None

Technique: CT chest abdomen and pelvis with intravenous contrast and oral contrast.

Findings: [Free Text]

Impression: [Free Text]

Figure 1. Example of a radiology report using basic headings. CT, computed tomography.

we review the evidence supporting the use of structured radiology reports, and discuss its pros and cons and the current prevailing sentiments among radiologists regarding structured reports. We describe some ways to overcome challenges and successfully implement structured reporting in daily practice and discuss the future of radiology reports in the modern era of precision medicine.

ADVANTAGES OF STRUCTURED REPORTING

A review of literature shows that structured reports have many advantages for radiologists as well as referring physicians (Table 1). Both radiologists and referring clinicians are interested in reducing the rate of diagnostic errors, which for radiologist accounts for as much as 4% of reports (14–18). One of the most common causes for malpractice lawsuits against radiologists is a missed diagnosis (19–22).

Although diagnostic errors in radiology are multifactorial, an important contributing factor is cognitive bias, arising from the radiologist's "satisfaction of search" (23). This error occurs when a radiologist prematurely stops "searching" for diagnoses, after making the initial diagnosis, based on clinical history. Using a checklist and a systematic search pattern may help to avoid such diagnostic errors (24–27). In a retrospective review of 3000 lumbar spine magnetic resonance imaging (MRI)

Examination: CT chest abdomen and pelvis
Clinical History: Renal cell carcinoma
Indication: Restaging
Comparison: None
Technique: CT chest abdomen and pelvis with intravenous contrast and oral contrast.

Findings:
Chest
Lung and large airways: [No suspicious pulmonary nodules]
Pleura: [No pleural masses. No pleural effusion]
Vessels: [Normal appearances of the thoracic aorta and its branches. Normal appearances of the superior vena cava]
Heart: [No cardiomegaly or pericardial effusion]
Lymph Nodes: [No thoracic adenopathy]

Abdomen
Liver: [Normal]
Bile ducts: [Normal]
Gallbladder: [Normal]
Pancreas: [Normal]
Spleen: [Normal]
Adrenals: [Normal]
Kidneys: [Status post right nephrectomy. No recurrence in the right nephrectomy bed. Normal left kidney.]
Lymph nodes: [No abdominal adenopathy]

Pelvis
Reproductive organs: [Normal appearances of the uterus and ovaries]
Bladder: [No filling defects in the bladder]
Bowel: [No bowel wall thickening. No dilated bowel loops]
Lymph nodes: [No pelvic adenopathy]
Peritoneum: [Normal]
Vessels: [Normal appearances of the renal vessels, inferior vena cava, abdominal aorta and its branches]
Retroperitoneum: [Normal]

Other
Abdominal wall: [No abdominal wall masses]
Chest wall: [No chest wall masses]
Bones: [No suspicious osseous lesions]

Impression
[Status post right nephrectomy. No evidence of recurrence in the surgical bed. No metastasis in the chest, abdomen or pelvis]

Figure 2. Example of a structured radiology report using subheadings specifying organs and the organ system within the findings section. CT, computed tomography.

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