# Improvement in Reporting Skills of Radiology Residents with a Structured Reporting Curriculum

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**Rationale and Objectives:** Radiology residents must acquire dictation and reporting skills to meet Accreditation Council for Graduate Medical Examination requirements and provide optimal patient care. Historically, these skills have been taught informally and vary between institutions and among radiologists. A structured curriculum improves resident report quality when using a quantitative grading scheme. This study describes the implementation of such a curriculum and evaluates its utility in tracking resident progress.

**Materials and methods:** We implemented a three-stage reporting curriculum in our diagnostic radiology residency program in 2009. Stages 1 and 2 involve instruction and formative feedback composed of suggestions for improvement in a 360° format from faculty, peers, and others within the resident's sphere of influence. The third stage involves individual, biannual, written feedback with scored reports specifically assessing four categories: succinctness, spelling/grammar, clarity, and responsible referral. Biannual scores were collected from 2009 to 2013, sorted by year of residency training (R1 to R4), and average training level scores were statistically compared.

**Results:** Review of 1500 reports over a 4-year period yielded a total of 153 scores: 54, 36, 29, and 34 from R1, R2, R3, and R4 residents, respectively. The mean (standard deviation) scores for R1, R2, R3, and R4 residents were 10.20 (1.06), 10.25 (0.81), 10.5 (0.74), and 10.75 (0.69), respectively. Post hoc analysis identified significant differences between R1 and R4 residents ($P$ = .012) and R2 and R4 residents ($P$ = .009).

**Conclusions:** Residents' reporting scores showed significant improvement over the course of their residency training. This indicates that there may be a benefit in using an organized reporting curriculum to track resident progress in producing reports that may improve patient care.

**Key Words:** Milestone; dictation; report; reporting; core curriculum; communication skills; scoring; core.



The Accreditation Council of Graduate Medical Education (ACGME) has recently released the Next Accreditation System, which requires the individual specialties to develop specific milestones that residents should meet at expected intervals throughout their training within the six core competencies (1,2). Two of the six core competencies outlined by the ACGME are patient care/technical skills and interpersonal/communication skills (1). The graduating resident is expected to meet milestone level 4 of these core competencies. For example, in diagnostic radiology under interpersonal/communication skills, the resident "communicates complex and difficult information, such as errors, complications, adverse events, and bad news" (3).

Radiologists provide quality patient care by communicating succinct, clear, and accurate information to referring physicians (4). This can be in the form of the radiology report and through direct consultation with clinicians on a specific patient's imaging needs. Recent evidence suggests primary care physicians are generally very satisfied with radiology reports, but they differ in what aspects of the report they value most (5). Because the radiology report is the primary and most frequent mode of communication, it is important for radiology residents to complete their training with competent effective dictation and reporting skills. Furthermore, it is notable that improper communication is the second most common reason for malpractice lawsuits (6) and can lead to significant patient and referring physician dissatisfaction with care (7). Thus, obtaining excellent communication skills may help avoid malpractice lawsuits, improve patient care, and indirectly lower health-care costs.

Training in radiology reporting focuses on establishing skills to provide a succinct, accurate, clear, and confident report that prioritizes imaging findings, includes pertinent negatives, documents responsible referral, and provides adequate explanation of imaging recommendations. These skills, which are developed during residency training, impact patient care by forming the basis for future reporting patterns.

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Historically, the method through which most residents have attained reporting skills has been a role model apprenticeship paradigm (1). This informal paradigm offers both advantages and disadvantages. One advantage is one-on-one personal lectureship by program faculty who tells the trainee what to say and how to say it. A major disadvantage of this approach is the broad variability across faculty radiologists (8). This informal method lacks standardization and may cause conflict not only in educating residents but also in the evaluation of reporting skills. As radiology reports become more standardized, it is necessary for training programs to prepare residents by implementing a curriculum that follows a similar trend (9–11).

The purpose of this article is to describe the implementation of a three-stage reporting curriculum with achievement cutoffs and evaluate its effect on residents' core communication and reporting skills.

## MATERIALS AND METHODS

This study is exempt from institutional review as it is research regarding an educational curriculum not involving minors (12). In 2009, our residency implemented a standardized reporting curriculum. The role model apprenticeship paradigm is now augmented by a formal curriculum based on the American College of Radiology's practice guidelines for communication of diagnostic imaging findings, helping to create a more consistent learning environment (13). This is further delineated with the new ACGME milestones in which the core competency of interpersonal and communication skills has been split into ICS1: effective communication with patients, families, and caregivers and ICS2: effective communication with members of the health-care team (3). Under the level 4 expectations for ICS2 (for graduating residents), the written/electronic milestone states: "efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases" (3). This milestone is specifically addressed with the curriculum currently in practice at our institution, which analyzes this aspect of the report as part of the scoring process.

The first stage of the curriculum occurs during orientation, at which time residents individually complete three online modules, each lasting approximately 30–60 minutes, achieving a passing score of at least 75% (14). These modules provide a basic foundation in reporting before residents ever dictate a radiology report. Table 1 outlines the modules and their respective subsections. Module 1 focuses on foundations of radiology reporting (key findings, clinical urgency, and general concepts). Module 2 describes the report components. Module 3 covers communication beyond the radiology report (responsible referral). Residents must place documentation of passing modules 1–3 in their portfolios (4). Completion of these modules is followed by a session with the radiology program director. This session lasts approximately 1–1.5 hours. It is both didactic and involves an active learning portion requiring residents to identify preferable statements when given choices. This experience furthers the discussion of the modules and clarifies what is meant by reports that emphasize the use of succinct, clear, confident, and accurate wording, as listed in Table 2.

The second step in the curriculum, which was in place before the new curriculum implementation, involves suggestions for improvement on monthly formative faculty evaluations of resident communication and reporting skills. Monthly evaluations, which are part of most residency training programs, are completed by attending radiologists, peers, and others within the resident's sphere of influence as part of the 360° process. Each faculty member who worked with that resident over the previous month is asked to respond to two statements on these evaluations regarding resident reporting as follows: "resident recognizes, appropriately communicates, and documents in the patient record urgent or unexpected radiologic findings," and "resident produces radiologic reports that are accurate, concise, and grammatically correct." Resident communication is rated by faculty on a 5-point scale as 1, poor; 2, below average; 3, average; 4, above average; or 5,excellent. Formative faculty evaluations are not anonymous, allowing residents to specifically address faculty comments.

The third step in the reporting curriculum, which was implemented in 2009, involves biannual resident report scoring. Resident reports are first scored 6 months after matriculation. Ten reports, dictated with a variety of attending radiologists covering a variety of modalities from the prior 6 months, are submitted by each resident. The program director confirms the faculty and modality variety during scoring and has the option to require resubmission if sufficient variety is lacking. These 10 reports are scored by a single evaluator, the program director. Each resident report is scored in four skill subcategories with a maximum of 3 points in each category for a total of 12 possible points (perfect score). Skill areas assessed include succinctness, grammar and spelling, clarity, and appropriate/responsible referral (Fig 1). The report grading categories are based on what the residents learn in the teaching modules, as well as from working individually with faculty, and are reinforced on formative faculty evaluations. Deductions are taken in quartiles for each error in the 10 reports, with all scores ending in 0.25, 0.50, 0.75, or 0. In other words, each instance of spelling/grammatical error, verbosity, use of unclear jargon, or lack of responsible referral warrants a deduction of 0.25 points per instance. Each deduction taken is explained in the program director comments at the bottom of the score card.

There is some room for subjectivity in this scoring system, that is, if a vague term is used in the appropriate manner, no points are deducted. Residents at the R1, R2, R3, and R4 levels must achieve minimum target scores of 9.0, 9.5, 10.0, and 11.0, respectively, which were developed after the initial experiences with this system. Finally, the resident receives specific written feedback about each deduction at the bottom of each score card. These reports are scored in a random order without review of the prior reports or other residents' score