Consensus-Oriented Group Peer Review: A New Process to Review Radiologist Work Output

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The Joint Commission and other regulatory bodies have mandated that health care organizations implement processes for ongoing physician performance review. Software solutions, such as RADPEER™, have been created to meet this need efficiently. However, the authors believe that available systems are not optimally designed to produce changes in practice and overlook many important aspects of quality by excessive focus on diagnosis. The authors present a new model of peer review known as consensus-oriented group review, which is based on group discussion of cases in a conference setting and places greater emphasis on feedback than traditional systems of radiology peer review. By focusing on the process of peer review, consensus-oriented group review is intended to optimize performance improvement and foster group standards of practice. The authors also describe the software tool developed to implement this process of enriched peer review.

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INTRODUCTION

Peer review is a process by which physicians evaluate the professional performance of their colleagues. The past decade has seen increasing recognition of peer review as an essential aspect of a comprehensive health care quality and safety framework [1]. In 2007, the Joint Commission expanded its practitioner performance requirements by requiring both focused and ongoing professional practice evaluations [2,3]. The ongoing professional practice evaluation requirement was intended to ensure that organizations routinely look "at data on performance for all practitioners . . . to allow them to take steps to improve performance on a more timely basis" [4]. Radiology peer-review systems may be used by health systems to meet some of the requirements of ongoing professional practice evaluation [5]. The ACR has also encouraged the radiology community to adopt a routine practice of peer review [6].

Much of the interest in peer review is premised on the belief that it can drive clinical improvement by monitoring the quality of care rendered, thus increasing adherence to standards of care, reducing errors, and promoting a culture of safety. A Cochrane review of 140 randomized trials suggested that audit and feedback interventions, such as peer review, can be effective in improving professional practice, particularly when attention is paid to the delivery of feedback [7]. However, studies evaluating the ability of peer review to influence clinical practice have been limited in scope and demonstrate mixed findings [7-11]. We are not aware of any study that has specifically assessed radiology peer review systems in this context.

Elements of an effective peer-review process include fairness, consistency, objectivity, defensible conclusions, balance through a diversity of opinions, timeliness, transparency, useful action, and regular auditing [1,12]. Larson and Nance [13], referencing successes in the aviation industry, recommended a nonpunitive approach focused on identifying opportunities for meaningful systems-based change rather than simply identifying physician outliers. Others have backed a proactive peer-review mechanism in which all studies are potentially open to review, as opposed to a reactive process in which only cases with known or suspected errors are subject to review [1,14]. In the current environment of shrinking margins and increased pressure on productivity, peer review activities should have negligible effect on workflow. Workstation-integrated

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peer review systems have been important in achieving this goal.

RADPEER™ is a workstation-integrated peer-review system developed by the ACR. Available for nearly a decade, RADPEER has been deployed in many practices [15]. Modeled after the traditional process of double reading, RADPEER relies on a single reviewer to identify discrepant interpretations and assign to them a level of clinical significance. Its success has prompted the development of a number of similarly designed competitor systems, such as PeerVue, Medicalis, and Primordial. Limitations of the RADPEER process (and similarly designed systems) include nonrandom selection of cases for review, lack of anonymity of the radiologist under review, lack of timeliness of the case review, and the limited number of reviewers per case (ie, limited to a single or sometimes two radiologists) [14]. Additionally, to achieve integration into radiology workflow, these systems are primarily focused on the identification of interpretive errors, with far less attention paid to other aspects of quality (such as report length, compliance with standards, etc) and participant feedback. Newer iterations of this general approach have placed heavier emphasis on contextualized feedback to the radiologist under review [16].

In light of the limitations of currently available systems, we developed consensus-oriented group review (COGR). In COGR, groups of staff radiologists discuss current cases and reach consensus judgments regarding the appropriateness of the dictated reports. Designed around departmental teaching conferences, COGR is intended to foster the educational, peer coaching, and systems improvement aims of peer review, while collecting contextualized data regarding radiologist discrepancy rates. COGR, as described herein, is felt to better align with the changing understandings of peer-review effectiveness and complement the culture of our academic department [12,13]. This article also describes the software solution developed to streamline this new process of peer review.

COGR

The COGR process entails regular meetings of a group of radiologists to review a randomly selected sample of recent cases in a conference setting. For each case, the group views the images and the report together and attempts to arrive at a consensus as to whether the report as issued needs to be changed (eg, a consensus that the report as issued is acceptable, a consensus that the report should be changed, or a determination that no consensus can be reached). For a consensus to be reached, all radiologists present must agree. At our institution, with rare exceptions, only cases that have been interpreted by a radiologist participating in the conference are open for group review. As a result, the radiologist of record for each case anonymously participates in its review. However, participation of the interpreting radiologist in the review process is viewed as valuable but not essential to the COGR design. A schematic of the COGR process in its entirety is provided in Figure 1.

We created a software tool to integrate the COGR process efficiently into our institutional workflow. The main technical requirements are as follows:

- Authenticate radiologists against an enterprise-level user database;
- Enable radiologists to specify the parameters for a single conference (ie, which radiologists are participating, which types of cases will be reviewed, and how many cases will be reviewed);
- Connect to the radiology information system (RIS) to extract information about recent cases and randomly selected cases for review;
- Drive the PACS to display selected cases;
- Record the results of the group consensus;
- Store the answers to the survey question(s);
- Send reminder messages of the review process to radiologists as needed; and
- Display relevant statistics on participation and review rates.

We chose to implement the software tool as a web application using an open-source software stack (Ruby on Rails, PostgreSQL, and Ubuntu Linux).

A high-level schematic of the system architecture is shown in Figure 2. Briefly, radiologists participating in a conference use a web browser to interact with the COGR application server, which can access the departmental RIS (Centricity; GE Healthcare, Waukesha, Wisconsin) and the enterprise authentication server (Active Directory; Microsoft Corporation, Redmond, Washington). The server stores its state and history on its local database. As cases are shown to radiologists, the system connects to the PACS (Impax; AGFA, Greenville, South Carolina) to show the relevant images for the case under review. With these connections in place, the tool is able to gather all of the relevant information for the reviewing radiologists to drive a conference.

Radiologists' interaction with the program comes through a small number of screens. After logging in, the radiologist acting as the conference coordinator is shown a form that lets him or her set the parameters of the review conference. The conference coordinator specifies which radiologists are to participate in the conference, which types of examinations they wish to review, how many examinations they wish to review for each radiologist, and how old such examinations may be for inclusion (up to 1 week). When this form is submitted, the system queries the RIS for the examinations to make up the agenda of the conference. For each participating radiologist, the system selects a random sample of examinations within the conference parameters and then shuffles the examinations to create the agenda of the