ACR White Paper on Teleradiology Practice: A Report From the Task Force on Teleradiology Practice

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Teleradiology services are now embedded into the workflow of many radiology practices in the United States, driven largely by an expanding corporate model of services. This has brought opportunities and challenges to both providers and recipients of teleradiology services and has heightened the need to create best-practice guidelines for teleradiology to ensure patient primacy. To this end, the ACR Task Force on Teleradiology Practice has created this white paper to update the prior ACR communication on teleradiology and discuss the current and possible future state of teleradiology in the United States. This white paper proposes comprehensive best-practice guidelines for the practice of teleradiology, with recommendations offered regarding future actions.

Key Words: Quality of care, technology, teleradiology, teleradiologist, teleradiology company, regulatory issues, end-user standards, patient primacy, business standards of practice, disintermediation

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BACKGROUND

Introduction and Definitions

The rapid evolution of the corporate business model and the absence of a public ACR statement on acceptable practices and quality standards for teleradiology companies impelled John A. Patti, MD, chairman of the ACR Board of Chancellors, to establish the ACR Task Force on Teleradiology Practice in January 2012. The outcome of our work is this white paper. Its goals are neither to commend nor to condemn the practice of teleradiology but to comment on the current status of domestic teleradiology, propose guidelines for best practice, and recommend possible actions to the ACR.

In taking on this responsibility, the task force considered any instance in which diagnostic images are transmitted for purposes of interpretation to a location in the United States, beyond the immediate vicinity of where the images were acquired, to represent *domestic teleradiology*. A *teleradiologist* is the physician providing these interpretive services, and a *teleradiology company* is an entity that employs multiple teleradiologists and engages in the management of workflow and image distribution. We refer to the site at which the images are actually acquired as the *transmitting site*. The site at which either a preliminary or a final interpretation is provided is the *receiving site*.

Prior ACR Comments on Teleradiology

Several extant ACR documents address the topic of teleradiology. In 1994, the ACR Council adopted a resolution concluding that state licensing boards should require licensure of

out-of-state physicians who provide official, authenticated written radiological interpretations of examinations that are performed on patients in the licensing state but interpreted in another jurisdiction, provided that such law or regulation does not restrict the ability of

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radiologists to provide second opinion radiological consultations requested by physicians in states in which the consulting radiologist is not licensed. [1]

In 2005, the ACR Task Force on International Teleradiology studied legal, regulatory, reimbursement, insurance, quality assurance, and other issues associated with the practice of international teleradiology, whereby interpretations were generally outsourced and preliminary in nature [2]. The ACR, along with the American Association of Physicists in Medicine and the Society for Imaging Informatics in Medicine, recently adopted and issued an updated 2012 ACR technical standard for the electronic practice of medical imaging [3] that defines the goals and qualifications for the use of digital image data, including the electronic transmission of patient examinations from one location to another for the purposes of interpretation. The forthcoming *ACR IT Reference Guide for the Practicing Radiologist* provides IT and informatics guidance on a wide range of topics across the practice of radiology, many of which are particularly relevant to teleradiologists practicing in a remote setting.

Current State of Teleradiology

After the 2005 ACR publication on international teleradiology, the teleradiology model of outsourced, preliminary after-hours interpretations experienced continued growth, but evidence suggests that market penetration peaked in 2010 at 50% (ie, half of radiology practices in the United States outsourced their call). Recent reports indicate that the preliminary interpretation market is decreasing as a sizable percentage of practices are "taking back the call" they previously outsourced [4].

In contrast to international teleradiology, in which the interpretations are preliminary, domestic teleradiology often provides final interpretations and represents a shift in the business model. Some domestic teleradiology providers offer a full complement of on-site and off-site imaging services, including procedures requiring the physical presence of a radiologist, subspecialty interpretations of images, and general management of the radiology department. This rapid evolution has led to the emergence of large public and private companies that often compete with established community and academic radiology group practices [5]. Some of these teleradiology companies are financially integrated subcontractors of larger health care systems [6]. These companies are under substantial pressure to demonstrate growth and profitability [4].

Given the saturated nature of the outsourced, preliminary teleradiology market and the need for large teleradiology companies to grow, the companies' focus has recently expanded to the acquisition of existing hospital radiology contracts [4]. For example, one company, Radisphere, sponsored a webinar titled "How to Run a Successful RFP Process," which included templates of the documents necessary to initiate the process of displacing a radiology group [7].

Despite the aggressive behavior of some companies, their success is not assured. Virtual Radiologic (vRad), a major national teleradiology firm, recently announced that it would cut the pay of its contracted radiologists [8]. Uncertain market forces have compelled other teleradiology companies to rebrand or retrench [9,10]. One example is the 2010 acquisition of NightHawk Radiology Inc by vRad, which merged the two biggest publicly traded teleradiology companies into one large private equity–controlled group [11].

Positives and Negatives of Teleradiology. Teleradiology has the potential to bring both positives and negatives to patient care. Radiologists have used teleradiology to simplify geographic and overnight coverage challenges as well as to strengthen subspecialty expertise. An important virtue of teleradiology is that many smaller hospitals that struggle to maintain adequate off-hour and subspecialty coverage can rapidly provide high-quality interpretations around the clock. Centralized image distribution hubs allow efficient access to qualified teleradiologists by hospitals and emergency departments needing quality reports for their imaging services. These hubs can also assist small groups to match manpower capacity with volume fluctuations or vacation coverage, obviating the need for more expensive on-site solutions.

Unfortunately, some teleradiology companies focus exclusively on report delivery. Besides devaluing our specialty and undermining the role of the radiologist as an independent expert in diagnostic imaging and a fully engaged member of the consulting team, this practice further commoditizes the product of our efforts [12].

The End Users. The principal end users of teleradiology services include hospitals, radiology groups, referring physicians, and patients. Among the largest of these are hospitals that directly contract with teleradiology service providers, typically providing a combination of on-site and teleradiology coverage. There is also a significant number of contractual relationships between radiology groups and teleradiology service providers whereby the teleradiology companies provide supplemental after-hours coverage or bolster subspecialty coverage that would otherwise be inadequate, intermittent, or nonexistent. Additionally, radiology groups frequently participate in teleradiology off-site coverage arrangements with remote regional hospitals or local imaging centers. Referring physicians, including emergency room physicians, can be considered end users because they base clinical management decisions on teleradiology reports and conduct telephone and video consultations with teleradiology physicians. Additionally, there is a small but growing group of patients seeking direct access to interpreting radiologists or second opinions on their imaging studies [13,14].

The variety of teleradiology end users and their complex interrelationships present a need for guiding princi-

ples that address most situations and are sufficiently precise and rigorous to ensure that a critical threshold of quality and safety is achieved in all arrangements. To satisfy this need, the task force defined 4 guiding principles that should underlie all teleradiology activities. These principles are consistent with the professional practice standards for any imaging activity. The recommendations that follow in this paper are based on these important principles:

1. Patients are the primary focus. First and foremost, all teleradiology relationships should be patient centered. Therefore, teleradiology relationships should adhere to the Institute of Medicine's [15] call for accessible, safe, accurate, and timely care. Secondary incentives, financial or otherwise, should never supersede patient primacy.
2. On-site coverage is preferred. Radiologists are the recognized experts in medical imaging, and their contribution to the health care team goes beyond simply providing interpretive reports [16]. Teleradiology services, ideally, are supplemental to a comprehensive on-site radiology practice. An intangible benefit of the on-site practice component is that the physician is tied to the community, providing motivation to deliver a higher level of care.
3. There should be a single high professional standard of quality for both teleradiology providers and on-site radiologists. Using different standards based on the location of the radiologist does not support the best patient care. Any model of radiology coverage, including teleradiology, should meet the standards of long-term, on-site coverage.
4. Teleradiology service should be incorporated into the local operations related to safety and quality within the radiology practice, hospital, or imaging center and be assimilated into the usual medical staff credentialing and privileging process.

TASK FORCE RECOMMENDATIONS

The Teleradiologist

A critical component of teleradiology services is the teleradiologist, who must possess and maintain appropriate professional qualifications. These qualifications relate to licensure, medical staff membership and privileges, board certification, and malpractice insurance coverage.

Licensure. States mandate and enforce medical licensure through legislation and regulation by the states' medical boards. To ensure that the full resources of a state are available for the protection of patients, medical practice is considered to occur at the location of the patient [17]. The task force endorses the ACR's 2012 Technical Standard for Electronic Practice of Medical Imaging [3] requirement that radiologists be familiar with the licensure requirements for providing teleradiology services at both the transmitting and receiving sites and obtain licensure as appropriate. Under current law, that would typically involve licensure in the transmitting state, but not necessarily the receiving state.[1,2]

The teleradiologist must maintain all appropriate licensures and should be in good standing with the appropriate state medical board(s), and any pending or closed malpractice cases should be disclosed to all parties, as should previous offenses incurred during the delivery of care. The teleradiologist should not have been excluded from any federal health care program. In any case, regulations should not restrict the ability of radiologists to provide second-opinion consultations when requested in a jurisdiction where the consulting radiologist is not licensed [1].

Medical Staff Membership and Privileges; Malpractice Coverage. The task force recommends that teleradiologists possess medical staff membership and appropriate privileges at all transmitting hospitals and facilities and have professional liability insurance coverage in the transmitting and receiving states.[3]

Board Certification. Teleradiologists should fulfill all requirements for initial training and maintenance of competence set forth in the applicable ACR practice guidelines and technical standards for the examinations they interpret [19].

Continued Quality Improvement. Teleradiologists, like all physicians, should participate in quality improvement initiatives. This includes meeting the requirements for continuing medical education (CME) and continu-

[1] Most states require a full and unrestricted license to practice telemedicine. Many states have adopted formal telemedicine policies, but in the states that have remained silent, it is implied that telemedicine is no different from any practice of medicine requiring licensure [18].

[2] There is no specific language, however, from the Federation of State Medical Boards or the individual state medical boards to support the requirement for licensure in a state other than that in which the patient resides, nor is there a clear legal basis for states to have authority over actions affecting only citizens of another state. The AMA has adopted language supporting full and unrestricted licensure for out-of-state physicians practicing medicine via telemedicine, but it does not require that a teleradiologist who interprets studies that occur in another state maintain a license in the state in which the interpretation is provided (ie, the receiving site) [19]. Furthermore, the ACR Task Force on International Teleradiology limited its recommendation to requiring licensure in the transmitting state [2].

[3] The 2012 ACR Technical Standard for Electronic Practice of Medical Imaging states, "When interpreting images from a hospital, physicians should be credentialed and obtain appropriate privileges at that institution. Physicians providing domestic and international teleradiology services should consult with their professional liability carrier to ensure coverage in both the sending and receiving sites (state or jurisdiction). The malpractice insurance coverage and claims jurisdiction should be determined by those contracting to receive teleradiology services" [3]. Therefore, teleradiologists should have malpractice insurance coverage at the transmitting and receiving sites. The amount of coverage should meet all local requirements for coverage, satisfy contractual obligations with facilities, originate from a rated carrier, and be verifiable upon request.

ing experience (CE) required for state licensure and accreditation of facilities served by the teleradiologist.

Peer Review. The teleradiology provider should regularly participate in an established quality assurance program, including formal peer review, to ensure patient safety. Such programs should address physician education and error reduction, enable longitudinal follow-up, provide an opportunity for a second opinion when the local caregivers raise concern, and include a process of remediation for low-performing radiologists. A number of well-established approaches exist, notably the ACR's RADPEER™, which assesses the accuracy of diagnosis performed by colleague radiologists using prior studies. CMS, third-party payers, and The Joint Commission have also initiated radiology peer review programs [20].

The Teleradiologist's Work Environment

It is the responsibility of the teleradiology company to ensure the appropriate ergonomic conditions, monitor characteristics, and privacy and security protocols are in place for their teleradiologists.

Ergonomic Factors. With the now universal use of computer workstations to view images and generate imaging reports, the role of ergonomics must be considered. A well-designed work environment reduces fatigue and repetitive stress injuries, such as neck pain and carpal and cubital tunnel syndromes.

The positions of the work chair, workstation table, keyboard, mouse, and monitors, as well as environmental factors such as ambient room lighting, temperature, and noise, should be considered to maximize comfort, efficiency, and accuracy of interpretations. Other applications, such as speech recognition software, electronic medical records, e-mail, and telecommunications, should be appropriately placed and integrated into the workstation. The recommendations of Harisinghani et al [21] and Goyal et al [22] are useful guides in these regards.

Monitor Characteristics. Currently, radiologists almost exclusively view imaging tests on computer monitors. Liquid crystal display monitors are preferable to cathode ray tube monitors, and a two-monitor PACS display setup is considered more functional. A third monitor can display radiology information system and speech recognition applications [23-25].

Viewing stations used by teleradiologists interpreting mammographic images fall under technical requirements set forth by the Mammography Quality Standards Act of 1992 [26], which states that a viewing workstation must follow the same quality control methods and technology as set forth by the medical manufacturer of the imaging modality. Image display calibration, monitor resolution size, and display calibration frequency on any remote diagnostic workstation must conform to the imaging modality manufacturer. To date, most imaging modalities that have applied for FDA [27] approval did so with 5-megapixel monitors.

Privacy and Security. Teleradiology groups are covered entities under the HIPAA privacy and security rules [28], which set standards for the electronic exchange of health information and for training, risk analysis, and security. Teleradiology providers must ensure compliance with the privacy and security rules, recognizing that teleradiology's unique nature may present compliance challenges. All equipment and transmittal interfaces should follow the security requirements mandated by HIPAA, regardless of the reading location or setting. This may be daunting for larger providers, who may have 100 or more interpreting radiologists, many of whom practice in their own homes.

Interpretive Services

The task force considered 3 important principles relevant to image interpretation: (1) the importance of patient primacy; (2) the requirement that all professional services and interpretations be accessible, safe, accurate, and timely; and (3) the condition that the teleradiologist be responsible for the quality of all images interpreted. Interpretive services provided by all radiologists, including teleradiologists, represent a continuum that begins before image acquisition and extends beyond the rendering of the report. Teleradiologists should be engaged at all points in this continuum. Specifically, teleradiologists should be engaged, directly or in a supervisory role, in the following activities before the actual acquisition of the study: selection of the appropriate imaging tests, supervision of the protocoling of studies and patient preparation, decisions regarding the use of intravenous contrast agents, and radiation safety.

After the image is acquired and interpreted, the teleradiologist should be engaged in the communication of results, particularly critical findings. A teleradiology provider should always be available for consultation with referring physicians or on-site radiologists, even if the request comes days after the date of interpretation. Moreover, peer review and quality improvement should continue long after the patient encounter. Importantly, this level of engagement requires trouble-free, reliable communication channels between teleradiologists and end users.

Ghost Reading. The ACR had previously commented on the practice of radiologists' signing reports initially read by teleradiologists without reviewing the images, so-called ghost reading. In response to reports of this practice, the Council addressed its ethical implications:

> It is unethical and likely fraudulent for a physician who has not personally interpreted the images obtained in a radiologic examination to sign a report of that examination in a manner that causes the reader of that report to believe that the signing radiologist was the interpreter. This practice, known as ghost reporting, should be strictly prohibited. [29]

The task force believes that this definition should be updated to indicate that ghost reading is definitely fraudulent on the basis of the recent conviction of a radiologist on 40 counts of fraud and obstruction of justice related to signing thousands of radiology reports neither he nor another radiologist actually viewed [30].

Relevant Prior Imaging and Reports and Electronic Medical Record Integration. Interpretations should be made with complete availability of relevant collateral information, including previous imaging studies, electronic medical records, and details on the patient's clinical symptoms and suspected diagnoses. This recommendation creates unique challenges for teleradiology companies that provide services to outside organizations. Under these arrangements, teleradiologists may not have adequate access to prior reports, images, or other pertinent patient information. This shortcoming may negatively affect the teleradiologist's ability to determine whether a finding is important. The lack of proper comparisons and relevant information yields less value to the patient and potentially causes the patient to incur the unnecessary costs and anxiety of additional testing. To minimize this problem, all efforts should be made to ensure meaningful comparisons of imaging studies across all settings.

When this shortcoming occurs, radiologists, referring physicians, and patients should be made aware of this potential disparity between on-site and teleradiology interpretations in terms of completeness, quality, and overall value. It may be preferable in these circumstances for the teleradiologist to render a preliminary report only, outlining the limitation, which could be corrected in the final report.

Physician-to-Physician Communication. In general, communication between the interpreting radiologist and the referring provider or their representatives should be readily and bidirectionally available and consistent with the ACR Practice Guideline for Communication of Diagnostic Imaging Findings [31]. Pathways of easy and prompt communication should be well established, agreed upon, and facilitated by both parties. Although various delivery formats are available, including a landline telephone, smart phone, electronic medical record, e-mail, and voicemail, the delivery method should be the choice of the referring provider.

The communication of critical test results, a Joint Commission National Patient Safety Goal, is important to the practice of radiology because failures in this process can lead to patient morbidity and mortality. It is also one of the major contributors to malpractice claims in radiology [32,33]. Different levels of acuity and criticality should be predefined and should include the time frame during which critical test results should be communicated. Some results may require synchronous (usually via telephone) physician-to-physician communication. Given the potential for delays and the importance of the information, teleradiologists should escalate their efforts to communicate when a provider cannot be reached immediately. The parameters for escalation should be predetermined and the process terminated only when the appropriate provider acknowledges receipt of the report.

An important component of critical test result communication is an audit trail. This includes return receipt for all asynchronous communications and detailed documentation of communication in the finalized radiology report. If critical test result management software is used, it must store audit trails that include active acknowledgment of report receipt, as well as time and date.

There should be a defined process for resolving discrepancies between preliminary and final interpretations. The interpreting physician should be available for consultation with the ordering clinician and with local radiologists. A process should be in place to provide additional review upon obtaining additional historical examinations or clinical information, as well as the production of appropriate addenda to the final report. There should be a means to request an overread in a case in which a clinician or local radiologist has questions or concerns regarding the initial interpretation. The discordant interpretations should be incorporated into both the hospital and the teleradiology peer-review process.

Turnaround Times. Rather than setting a precise standard for the allowable time between imaging completion and interpretation communication (ie, turnaround time), the task force believes that turnaround times for teleradiology interpretations should be set in accordance with accepted hospital and departmental requirements. The provider may choose to define specific metrics determined by a multidisciplinary team that could include local radiologists, emergency department physicians, at-large members of the local medical staff, and hospital administration. Turnaround times should be commensurate with other intradepartmental policies and should not be more or less stringent than for on-site radiology except for compelling patient-centered reasons.

Communication Between Radiologists and Radiology Technologists (RTs). The task force emphasizes that all RTs and sonographers must function under the supervision of a qualified licensed physician. Therefore, maintaining communication between the radiologist and RT or sonographer is critical to the teleradiologist's role across the imaging enterprise. Such communications are critical to ensuring overall quality and patient safety by fulfilling 3 critical needs: (1) quality control, (2) transmission of relevant patient information, and (3) addressing RT or sonographer queries regarding study appropriateness.

This presents unique challenges for teleradiologists when traditional nonstructured verbal and paper-based communication mechanisms are not available. The out-

side teleradiologist will not have met and therefore will not have established a relationship with the RT or sonographer, meaning that a barrier in communication may exist between these individuals. Reliable communication is particularly important for ultrasound technologists, with whom seamless bidirectional feedback may be necessary during the examination itself (ie, while the patient is in the examination room).

Communication by any means must be timely. Failure to implement a responsive communications system for addressing RTs' questions and concerns can lead to a number of adverse events, including failure to diagnose a condition because of an inappropriate examination and unnecessary radiation exposure from an unnecessary study. Failure to have an adequate communications system in place prevents RTs from fully complying with their obligation under principle 6 of the American Registry of Radiologic Technologists' code of ethics, which requires RTs to "obtain pertinent information for the physician to aid in the diagnosis and treatment of the patient" [34].

Payment and Regulatory Considerations

In general, teleradiology services are paid under the same conditions as in-person physician services. However, the nature of teleradiology is such that the professional component (PC) of an examination is performed at a different physical address from where the technical component (TC) is performed. This difference in location affects billing, Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) [35] accreditation, medical directors' duties and supervision, and place of service as it relates to claims filing.

General Billing for Services. Earlier in this paper, the task force emphasized the importance of teleradiologist involvement from the time of ordering to well beyond the generation of the report. A teleradiologist who bills Medicare submits a CMS-1500 form, which certifies that the teleradiologist provided the entire service associated with any specific procedure [36,37].

Accreditation for Offices (MIPPA). MIPPA mandates the accreditation of suppliers of the TC of advanced diagnostic imaging. MIPPA defines advanced diagnostic imaging procedures as MR, CT, and nuclear medicine or PET but excludes x-ray, ultrasound, fluoroscopy, and mammography.

Medical Directors' Duties. MIPPA-accredited facilities must have medical directors whose roles are supervisory and who serve to fulfill a number of regulatory, professional, administrative, educational, and quality initiatives. Medical directorship is required for optimal imaging facility functionality, whether the facility is part of a hospital network, a physician-owned practice, or an independent diagnostic testing facility (IDTF) [38].[4]

If a teleradiologist is to act in the role of medical director for an imaging center or department, he or she must fulfill these roles to ensure that the facility meets its obligations to payers and patients. Ideally, at the outset of the relationship, the medical director should visit the facility to ensure that policies and procedures are established and followed within the department. If this is not possible, a conversation with the managers and review of policies and procedures is acceptable. After the initial visit or phone discussion, the medical director should be readily available to the staff to address any issues that arise. Annual review of the records, policies, and procedures with management is encouraged. If the facility is designated as an IDTF, the medical director must fulfill all CMS requirements, including but not limited to serving as medical director for no more than 3 IDTFs [38].

Place of Service. Teleradiologists, and facilities employing their services, must understand and comply with CMS place-of-service rules as they relate to reporting the correct location for where the teleradiologist's services were performed. There are 3 general issues related to place of service: (1) reporting the correct physical location on the claim forms, (2) submitting the professional or global claims to the correct carrier or insurance company, and (3) filing claims with the appropriate carrier or insurer as this relates to enrolment issues. Adding to this complexity are the differing requirements between Medicare and commercial insurers and the practice of medicine across payment jurisdictions and state lines.

Since April 1, 2004, CMS has required that physicians specify where services were provided when submitting their claims. More recently, on October 11, 2012, CMS issued Transmittal 2613, clarifying certain aspects of the rule but leaving the general requirement intact. Essentially, CMS requires teleradiologists to submit the address where they were physically located when performing their interpretations as the work address, regardless of where the TC was performed. The only exception to this is when "the professional interpretation was furnished at an unusual and infrequent location for example, a hotel, the locality of the professional interpretation is determined based on the Medicare enrolled location where the interpreting physician most commonly practices." In addition to identifying the teleradiologist's work location, CMS requires that claims for the teleradiologist's services be submitted to "the B/MAC [Part B Medicare carrier] which processes claims for the payment

[4] The medical director collaborates with the administrative director of the facility to devise the policies and procedures for the facility and to review them at least annually. They are responsible for ensuring that all professional and technical staff members meet the obligations set by the policies and procedures. The medical director may at times also have disciplinary responsibilities if professional or technical staff members fail to meet these obligations [38].

locality where the . . . service was furnished" (ie, the Part B Medicare carrier that has jurisdiction over the teleradiologist's work address reported on the claim) [39].

The combination of these 2 rules has significant implications for the billing of teleradiology services to Medicare:

1. It requires teleradiologists to report the physical location where they performed their work, not simply report the address where the TC was performed (unless that is where they performed the interpretation).
2. Each teleradiologist's work location must be separately and appropriately enrolled with the Medicare carrier that has jurisdiction over that geographic area.
3. It will frequently require teleradiologists to enroll with and submit claims to a carrier that is different from the carrier to which the TC was submitted.
4. Global billing is prohibited unless the billing entity is the same for both the PC and TC, and both components are performed within the same Medicare payment locality [39].

Requirements governing the submission of commercial insurance claims vary and are subject to numerous state laws, as well as the terms of the contract between insurer and provider, and are therefore too numerous to address here. However, the ACR believes that, absent state and contractual laws to the contrary, it is best practice to enroll each teleradiologist's work location with the insurer and report the teleradiologist's physical location when performing the interpretation as the service location on the claim form.

Antimarkup. Teleradiology services are frequently provided to IDTFs and physician practices performing services covered by the federal Stark self-referral law under its in-office ancillary services exception [40]. Because of the unique nature of these radiologic services and of teleradiology itself, many of these arrangements involve the reassignment of the PC from the teleradiologist to the facility performing the test, with the facility billing and collecting for the PC and paying the teleradiologist for his or her services at a prenegotiated fee. Through the antimarkup rule, CMS forbids the billing facility from "marking up" the claim for the professional services beyond what the providing physician would otherwise receive.[5,6]

It is incumbent upon both the facility contracting with teleradiologists for the provision of PC services as well as the teleradiologists to understand and comply with the antimarkup limitation as it pertains to such arrangements.

Technology-Specific Considerations

The electronic practice of radiology imposes a variety of technology requirements, regardless of setting. Many of these are outlined in both the ACR Technical Standard for Electronic Practice of Medical Imaging and the forthcoming *ACR IT Reference Guide for the Practicing Radiologist*. Basic infrastructure demands include appropriate and auditable measures to ensure redundancy, reliability, recoverability, privacy, and security. Connectivity demands are particularly important because there must be sufficient and reliable network bandwidth to work efficiently and meet contractual requirements that serve patient interests. Local systems, where applicable, will need to conform to guidance in areas such as monitor display, clinical workflow, and systems integration designed to minimize error.

Systems integration challenges are particularly important, such as those that avoid manually entering patient identifiers. The Institute of Medicine [43] report on redesigning health care emphasizes that safety must be a property of the tools physicians use and must not rely purely upon vigilance to prevent harm. For example, the emerging practice today is to directly integrate between the PACS and the dictation reporting system.

Integration with the ordering process is important so that the report generated will be accessible to the referring physician. Manually associating the report to the order leads to a higher level of patient misidentification errors and can lead to an adverse event through omission [44,45]. Detecting and repairing errors in these processes can take days, during which time fatalities have been reported [46].

[5] In 2008, CMS imposed an antimarkup limitation on the PC of diagnostic tests provided to IDTFs [41]. The antimarkup limitation is triggered when the facility bills and collects for the PC on behalf of the physician providing the PC service and then pays the physician for having performed the service. For services subject to the antimarkup limitation, "the payment from the facility to the physician who provided the PC may not exceed the lowest of the following amounts: [1] The performing supplier's net charge to the physician or other supplier; [2] The billing physician or other supplier's actual charge; or (3) The fee schedule amount for the test that would be allowed if the performing supplier billed directly." In 2009, CMS extended the antimarkup payment limitation on the PC of diagnostic tests to those that are performed under the in-office ancillary services exception of the Stark law [40,42]. This rule applies to the PC of diagnostic tests that are ordered by the billing physician or other supplier if the PC is outright purchased or if the PC is not performed in the office of the billing physician or other supplier.

[6] Although there are exceptions to the antimarkup rule, they are generally reserved for situations involving a direct employer-employee relationship between the physician office performing services under the in-office ancillary service exception and the teleradiologist. (The employment exception does not apply to IDTFs.) Because few teleradiologists are direct employees of transmitting sites, most teleradiologists' compensation arrangements will be subject to the antimarkup rule [40].

PRACTICAL CONSIDERATIONS FOR RADIOLOGY PRACTICES

Contract Considerations

Because of the large variety of situations in which teleradiology services are used, it is not possible to provide highly prescriptive recommendations for all the various components of the relationship between a teleradiology provider and a hospital or a local radiology group. The following is meant to provide a list of issues that should be considered and addressed during negotiations or within a contract for services. This is not meant as legal advice, nor is it all-inclusive of the issues that should be considered.

- Definitions of examinations and interpretations: There should be a clear statement of what constitutes a study or examination. Interpretations may be preliminary reports, with subsequent final interpretations provided by the contracting local radiologists, who will ultimately bill for the service. Alternatively, the teleradiology provider may issue a final or official interpretation and directly bill the insurer or patient. There may be different performance expectations for reporting time, completeness of the interpretation, and comparison with historical examinations for preliminary versus final interpretations.
- Hours of coverage.
- Minimum and maximum volumes of examinations: Teleradiology companies may seek to negotiate additional fees if minimum volumes are not met.
- Response time: There should be a defined time for most reports to be available. There may be different times for emergency examinations and routine studies or for preliminary reports versus final reports. Care should be taken in defining what starts the clock and what determines the end point. There should be provisions for rapid evaluation and communication of findings in emergent life-threatening situations. Critical results reporting should meet established institutional policies.
- Modalities covered: The specific modalities to be covered should be specified. There may be agreement for different response times and qualifications of the interpreting physician for different modalities, especially for specialized examinations such as coronary CT angiography and CT colonography.
- Subspecialty interpretations: A clear definition of what constitutes a subspecialist should be agreed upon. The specific examinations requiring interpretation by subspecialists should be defined. It is important that all parties have a clear understanding of how examinations are assigned. For examinations that require special attention, there should be a defined process for informing the teleradiology provider and routing the examinations to appropriate interpreting radiologists.
- Credentialing: Processing credentialing applications for a teleradiology provider can be a lengthy and costly process because there are advantages to obtaining privileges for a large number of providers. How many teleradiologists will be granted privileges and who is responsible for any associated fees should be understood.
- Quality assurance: The teleradiology provider should have an established quality assurance program including formal peer review. There should be a defined process for resolving discrepancies between preliminary and final interpretations. The interpreting physician should be available for consultation with the ordering clinician and with local radiologists. A process should be in place to provide additional review upon presenting new historical images or clinical information, as well as for dictating appropriate addenda to the final report. There should be a means to request second opinions in cases in which clinicians or local radiologists have questions or concerns regarding the initial interpretations.
- Malpractice coverage: The teleradiology provider should meet all local requirements for malpractice coverage.
- Accreditation: The teleradiology provider should meet all requirements for the facility's accreditation processes, including ACR accreditation.
- Records: The contract should define who owns records and is responsible for storage and HIPPA compliance.
- IT requirements: Responsibility for network connections, how issues are reported and resolved, and hours of tech support should be defined. Emergency downtime processes should be understood.
- Standard contractual issues: There should be delineation of typical requirements for contracts, such as the term of the contract, termination, warranties and covenants, indemnification, and confidentiality. Many contracts will include clauses for exclusivity on behalf of one or both parties.

COMPETITIVE MARKET FORCES

Members of traditional group practices have expressed concern regarding what they perceive as unfair competition potentially disrupting contractual relationships. Examples of radiology groups recently displaced from longstanding hospital coverage have generated considerable discussion of "predatory" business practices by teleradiology providers and raised the notion that outsourcing to teleradiology firms facilitates such upheaval [5,47,48]. As discussed earlier in this paper, some teleradiology companies are aggressively seeking to replace incumbent radiology groups. The term *disintermediation* refers to the exclusion of the local radiology group when direct contract negotiations occur between hospitals and teleradiology companies [4].

There is no doubt that the evolution of technology allowing remote image interpretation has lowered the barriers to competition. However, it does not necessarily follow that such competition is "predatory," which in business practice usually refers to pricing below cost to drive out competition. The activities of these companies are more confrontational and less collegial than radiology groups have experienced in the past. No longer are teleradiology companies passively waiting for groups to reach out to them; these companies are aggressively marketing themselves to hospital decision makers, a trend that shows little sign of slowing [4].

If not predatory, do these examples violate some business ethic, or are they simply examples of successful competition? In a recent ACR Chair's Memo, Patti [49] wrote of the ACR's "moral and legal obligation to objectively represent its entire membership" and therefore its "inability to take sides in business conflicts between competing members, even if that competition exceeds the boundaries of what once was a collegial process." However, Patti noted, the ACR can develop and advocate quality and performance guidelines, or best practices. These operational and regulatory guidelines for teleradiology are discussed elsewhere in this document. From the perspective of business practice, the burden of protecting existing contractual relationships between radiology groups and hospitals or imaging centers falls on the contracted radiology group.

First and foremost, radiology groups must understand that they create opportunity for competitors when they fail to satisfy the legitimate demands and expectations of their hospitals. Failure to provide rapid turnaround, subspecialty interpretations, or adequate coverage can force hospitals to consider alternatives. Hospitals may resent the competition of radiologist-owned imaging centers or the lack of flexibility in solving turf battles. Cost may be a reason as well, but it is harder for a hospital to displace a high-quality group that provides top-level service to the medical staff and community over disagreement on price alone [5]. It is important for radiology groups to remain aligned with the hospital system's strategic goals. Even better, radiologists would be well served to involve themselves in the planning process. Understanding the needs of the hospital, maintaining focus on quality and service, and aligning the incentives of the group with those of the hospital are important steps to preserve longevity in hospital relationships.

What precautions should be taken by radiology groups considering contracting with teleradiology providers? A simple step would be to include a noncompete clause in any contract with a teleradiology provider that the teleradiology company and any of its subsidiaries or successors will not seek business directly with the hospital or with any of the radiology group's existing customers. An additional consideration would be a notification clause requiring that the teleradiology provider disclose any communication that occurs directly between the hospital and teleradiology company, regardless of whether that communication was initiated by the provider or the hospital.

Radiology groups should explore the business focus of the teleradiology provider in advance of any consideration of a contract. Does the provider focus on contracts with other radiology groups, or does it also seek direct contracts with hospitals, imaging centers, and other entities? What public information is available about the company on its website or in public documents? What is the mission statement of the company? Have others experienced unreasonable competition or changes in a relationship? Are there references?

What about the radiology group's professional services contract with the hospital? Is there any language in the contract that describes circumstances under which the group can be displaced? Is it required that the current service levels and staffing be maintained or improved should displacement of the group occur? Can a hospital switch radiology providers without cause? Does the group contract include noncompete language for its own members so that the hospital cannot "cherry-pick" individual radiologists directly from the group to cover certain subspecialty areas and then substitute a teleradiology provider for the remainder of the group? The group's contract with the hospital should require the hospital to immediately disclose any communication with a teleradiology company, whether that company directly contracts with the group or not.

What obligations does a teleradiology provider have in this regard? At a minimum, there should be full disclosure of business strategy to potential customers; that is, companies should be willing to share and discuss whether and how they intend to market their services in the same market as any radiology group for which they provide services. Teleradiology providers should honor any noncompete contracts.

RECOMMENDATIONS TO THE ACR

1. The task force acknowledges the benefits teleradiology services can bring to patient care, including improved access to radiologic services and subspecialty expertise in settings in which it otherwise may not be available. Therefore, the ACR should continue to refine the guidelines and standards for teleradiology practice and work to develop protocols and software to better enable the bidirectional communication between physicians, technologists, imaging managers, and the like. Similarly, better protocols for electronic medical record integration, peer review interfaces, and nonmanual communications with dictation systems should be developed.
2. The task force is concerned that the emerging model of full-service teleradiology companies' assuming the professional contracts for facilities may be evolving

faster than the development of appropriate safeguards and acceptable work processes. Specifically, the evolving nature of teleradiology and the potential shortcomings described in this document could increase the possibility of communication errors, incomplete and nonactionable reports, and harm to patients ranging from increased radiation to major lapses in treatment. The ACR should continue monitoring the practice of teleradiology and work with its providers to ensure the use of teleradiology achieves the same high standards we expect from the more traditional practice model. The ACR should also remain watchful that incumbent radiology providers strive to maintain practices that are at least of the same quality as teleradiology providers.

3. Although the task force understands and appreciates the benefits teleradiology brings to the profession and the communities we serve, we also believe the traditional practice model of having on-site, local radiology groups may better serve the overall interests of most communities. The task force recommends that the ACR educate and inform its members as to how they should be changing to enhance their provision of noninterpretive services that may become critical to maintaining a presence at their respective facilities. This includes training for leadership roles within the hospital system, particularly as such roles relate to broader strategic planning. More important, every radiologist practicing within a group should strive to participate as fully as possible in the best quality patient care. Radiology groups that do not engage in such activities may find themselves more easily replaced by a corporate entity.

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