ACR Intersociety Conference 2003: Radiologist Assistants and Other Radiologist Extenders

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Improvements in imaging technologies are contributing to increases in the demand for radiology services. Efforts to match this rising demand are limited by the Centers for Medicare & Medicaid Services cap on resident positions and the challenges in obtaining appropriate visas and medical licenses for international medical graduates. This rising gap in the demand for and capacity to deliver radiology services has created a need for radiologist extenders. A variety of roles have been developed for these radiologist extenders, depending on the skills of the individuals and the subspecialty areas in which they work. Prominent among these are radiologist assistants, physician assistants, nurse practitioners, dosimetrists, and advanced-practice nuclear medicine technologists. Quality patient care is best accomplished when radiologist extenders function under the guidance of qualified radiologists, nuclear physicians, or radiation oncologists.

Key Words: Physician extender, radiologist assistant, advanced-practice nuclear medicine technologist, physician assistant, nurse practitioner

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The ACR Intersociety Conference met at the Ritz-Carlton Huntington Hotel in Pasadena, California, from August 1 to 3, 2003. Representatives of 41 radiology, radiation oncology, and radiological physics societies met to discuss the topic of radiologist extenders. The conference was established to promote congeniality within the field of radiology, foster and encourage communication among the radiological societies, and make recommendations on problems and areas of concern identified by the member societies at the conference. The Intersociety Conference has been held annually since the first "summit meeting" in 1979. Two members, often the president and president-elect, and one executive director of each participating radiology, radiation oncology, and medical physics society are invited to attend.

Diagnostic radiologists, interventional radiologists, nuclear medicine physicians, radiation oncologists, and medical physicists are struggling to satisfy the demands for their services, which are increasing, as indicated by the number of procedures performed, by about 4.5% per year [1]. The expanding size of the population and its demographic change to a more elderly one are increasing the demand for radiology services by about 1.5% each year. The change in medical practice reflecting the added value of radiology services is driving this demand even faster, by an additional 3.0% per year. This change in medical practice is due in large part to advances in the cross-sectional imaging modalities of computed tomography (CT), magnetic resonance (MR), and ultrasound, but it also includes the advent of positron emission tomographic scanning and improved techniques in interventional radiology and radiation oncology. Because these procedures are associated with higher relative value units (RVUs) than plain radiographs, the increase in work is even greater when measured in RVUs. Sunshine and Barchart [2] estimated an annual increase in work of 5.5% when measured in RVUs. Because the workforce shortage is not due to early retirement among radiologists, it is unlikely that the workforce can expand to accommodate the demand without a significant increase in the number of radiologists entering the workforce [3].

It is also getting more difficult to deliver these services. The documentation needed for billing has become more rigorous. The Joint Commission on Healthcare Organizations continues to raise its expectations as it surveys institutions. The teaching rules to satisfy the Accreditation Council for Graduate Medical Education and its residency review committees have significantly increased the overhead expenses of running a residency training program, and the limits on the hours residents may work mean that additional employees must often be hired to

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discharge duties once handled by residents. There are new security initiatives aimed at limiting access to health care information, and the Health Insurance Portability and Accountability Act has imposed more challenges to conducting clinical research and an added overhead burden in caring for patients.

The change in practice, which reflects the increased value of radiology procedures, has also resulted in heightened service expectations. Patients want timely access to imaging examinations at convenient locations, and referring physicians expect prompt result reporting 24 hours a day, 7 days a week. This geographic and temporal dispersion of radiology services is an added challenge to their efficient delivery.

Despite the growth and aging of the population, the number of residency training positions has remained constant. The numbers of house officers at each institution were frozen by the Centers for Medicare & Medicaid Services (CMS) at their 1996 levels. This freeze on house officer positions occurred at a particularly sensitive time for radiology, because many departments had voluntarily or involuntarily reduced the sizes of their training programs in anticipation of a decrease in the use of radiology services by as much as 30% to 50% as a result of managed care initiatives. Thus, the limitation on residency training positions, which affected all medical specialties, was especially severe on radiology. Radiology departments are not able to respond as if they were operating in a market economy and increase the sizes of their programs unless other departments surrender positions or their institutions agree to provide additional funding.

Residency training programs graduate approximately 1000 new radiology residents each year, and approximately 500 radiologists die or retire from active practice each year. If one assumes that there are 33,000 practicing radiologists, the net effect is an increase in the radiology workforce of 1.5% per year.

Thus, the gap between the increase in the demand for radiology services of 4.5% per year and the slowly growing supply of radiologists (1.5% per year) is approximately 3% per year. If one considers the continued transition from lower RVU examinations such as plain radiographs to higher RVU studies such as CT, this gap is even greater [2].

The implications of this widening gap between the demand for radiology services and the capacity to supply them are clear. Radiology work must be done. If radiologists are unable to interpret imaging studies and perform image-guided procedures, these studies will be done by others. There are many physicians trained in medical specialties other than radiology who are actively performing radiology work. They and others would be happy to accept additional radiology work, especially if the reimbursement is high and the malpractice risk is low.

Radiology must either increase its capacity to handle this larger volume of work or lose the business to others. Unfortunately, there are significant barriers to enlarging the workforce. The CMS cap on institutions is a strong disincentive to increasing the size of residency training programs. Although many well-trained radiologists from international programs may want to immigrate to the United States, visa restrictions are a major limitation. State medical licensure, hospital privileging, and requirements for American Board of Radiology certification are additional hurdles impeding the importation of radiologists to augment the workforce.

If the workforce cannot be adequately expanded, it must become more productive to increase its capacity. This may be accomplished through the use of information technology or by employing a variety of radiologist extenders to handle many of the duties that do not require the specialized training of radiologists. The majority of the Intersociety Conference was spent discussing the development of radiologist extenders and the specific tasks that may be done by others and the legal, billing, and educational implications of those arrangements.

The ACR and the American Society of Radiologic Technologists (ASRT) have issued a joint statement on the roles and responsibilities of "radiologist assistants" (RAs). Such persons would be radiographers certified by the American Registry of Radiologic Technologists (ARRT) who have successfully completed advanced academic (baccalaureate or postbaccalaureate) programs encompassing nationally recognized curricula and radiologist-directed clinical preceptorships. Under direct radiologist supervision, RAs perform patient assessments, patient management, and selected examinations or procedures but do not interpret radiology examinations. A number of universities are actively working to develop these programs.

Radiology physician assistants (PAs) have existed since the 1970s, when programs were initiated at the University of Kentucky, Duke University, and Brown University. Although each of these programs eventually closed because of a lack of demand, in 1996, the US Department of Defense asked Weber State University in Ogden, Utah, to develop a program to train radiology practitioner assistants to address a shortage of radiologists in the armed services. Although the Department of Defense no longer provides financial support to Weber State, this baccalaureate degree program graduates radiology practitioner assistants who are eligible for certification by a separate organization, the Certification Board for Radiology Practitioner Assistants.

There is an increasing trend toward the provision of health care by nonphysician providers. The number of

graduates of nonphysician provider training programs more than doubled between 1992 and 1997 [4]. State legislatures are aiding this trend by passing a series of laws expanding the scope of practice for these providers. In the 10 years between 1987 and 1997, the proportion of patients who saw nonphysician clinicians increased from 30.6% to 36.1%, an increase of nearly 20% in one decade [5].

There are many examples of the use of radiologist extenders to assist in the performance of imaging examinations. In 1969, Campbell *et al.* [6] described the successful use of "advanced radiologic technologists" to perform gastrointestinal fluoroscopy and spot-film procedures. They concluded that "the diagnostic quality and yield of examinations performed by technologists suffered no discernible loss in quality compared to those done entirely by radiologists." Hillman and colleagues [7] reported on the use of PAs to interpret mammograms. They found that interpretations by properly trained PAs were similar to those of general radiologists interpreting the same test set of mammograms.

Sumkin *et al.* [8] found that even without training, technologists can perform at reasonable levels of accuracy in classifying screening mammograms. Technologists are also able to interpret plain-film radiographs with a high degree of accuracy. Barker and coworkers [9] found that "specially selected advanced radiologic technologist students can be trained to evaluate radiographs as to the presence or absence of significant pathology with an accuracy equivalent to that of experienced staff radiologists."

A subspecialty in which radiologic technologists have a long history of performing imaging examinations is ultrasound. These skilled technologists routinely examine patients with ultrasound transducers and record representative images for radiologists to review. The ease with which images may be transmitted electronically with picture archiving and communication systems has made the remote supervision of ultrasound examinations done at distant sites feasible. It is not surprising that academic radiology departments are developing "sonographic practitioners" to take on additional responsibilities [10,11]. At the Intersociety Conference, Jay Heiken, MD, discussed the role of ultrasound practitioners in improving the efficiency of a radiology practice.

The improved capacity of computers to make complex calculations in fractions of a second has dramatically increased the ability to handle the enormous data sets generated during CT examinations. Although computer workstations enable radiologists to view images more rapidly, it is not realistic to review the more than 1000 images generated in many of these examinations. Methods of volume navigation, which are increasingly performed by technologists or other radiologist extenders to extract the diagnostic information from these data sets in a more efficient manner, were described by Dennis Foley, MD. Rotating three-dimensional displays, segmentation, multiplanar displays, and computer-aided detection are becoming routine in many practices. Technologists with skills beyond operating CT scanners are needed for volume navigation. These same principles can be applied to MR imaging, in which the problems are made even more complex by the many different imaging sequences that may be needed to optimally visualize tissue abnormalities.

Radiologist extenders may also provide valuable help in interventional radiology [12]. Physicians in other specialties will have access to image-guiding technology, and radiologists must be innovative, effective, and efficient to compete successfully. Trained individuals from a variety of backgrounds, including clinical nurse specialists, nurse practitioners (NPs), surgical assistants, PAs, and radiology PAs, have been used to extend the practice of interventional radiologists. They may perform a wide variety of functions in outpatient clinics, on admitting services, or in radiology suites. Working with interventional radiologists, they may provide evaluation and management services, including taking histories, performing physical examinations, ordering laboratory or imaging tests, communicating with referring physicians, and providing patient education. Within interventional radiology suites, they may act as first assistants or perform procedures under the direction of supervising radiologists. When properly credentialed, they may obtain their own unique physician identification numbers and bill for these procedures.

As medical care advances, there is an increasing need for venous access devices. Many of these are not technically demanding to place but often require image guidance. Radiologist assistants could play a central role as venous access specialists providing prompt, efficient service to patients needing these procedures before treatment can be initiated. Interventional radiologists can be available should complications arise, but they are freed to perform other procedures more demanding of their expertise. Janette Durham, MD, discussed the positive impact a PA has had in her interventional radiology practice and reminded us of the enormous opportunity to do more. Yet radiology has been slow to use the pathway of PAs. Among the more than 46,000 PAs in the American Academy of Physician Assistants, fewer than 0.5% (230) are in radiology.

The scope of advanced-practice nuclear medicine technologists (APNMTs) was discussed by Frances Keech, MBA, RT. Spurred by the success of PAs and NPs, a task force was created in 1998 by the Society of Nuclear Medicine to explore the feasibility of training APNMTs. The task force concluded that technologists

have many advantages over more traditional PAs or NPs. Not only are technologists already familiar with examination and radiation safety issues, but the development of APNMT positions would help create a career ladder for nuclear medicine technologists, thus improving recruitment and retention.

To qualify for the program as currently conceived, a nuclear medicine technologist would have to be certified by the ARRT or the Nuclear Medicine Technologist Certification Board and have a minimum of 3 years of experience. The technologist would need to have current certification in advanced cardiac life support and a bachelor's degree, preferably in a biological science, with a minimum grade point average of 3.0. The educational program, leading to a 2-year master's degree, would consist of 1 year of didactic courses and a second year of clinical rotations.

The roles and responsibilities of APNMTs would include taking clinical histories, performing physical examinations, and providing patient education. APNMTs would monitor examinations and review images for quality and completeness. More specific duties could be defined for working with patients undergoing stress tests, sentinel node studies, or therapy with radioactive materials.

Robert Bree, MD, discussed the differences between PAs working in radiology and the RA concept developed by the ACR and the ASRT. There are 131 programs accredited to train PAs. They average 26 months of training, which includes a year of basic science followed by a series of clinical rotations. The goal of these programs is to provide the training of practical skills in clinical problem solving. It is expected that the approximately 4000 graduates each year will work in partnership with physicians, not compete with them. The scope of their practice is based on their supervising physicians.

Physician assistants are regulated at the state level, usually through a board of medicine. There is a national certifying examination developed by the National Board of Medical Examiners and administered by the National Commission on Certification of Physician Assistants. Physician assistants must complete 100 hours of continuing medical education every 2 years, and there is a recertifying examination every 6 years. Work done by PAs may be billed to Medicare at 85% of physicians' fees.

Weber State University has a practitioner assistant program specific to radiology. These radiology practitioner assistant students are taught through a "distance-learning" program that allows them to maintain employment as radiology technologists during training. They must have local radiologist preceptors. Their scope of practice may include image interpretation and the performance of procedures.

Over the past several years, the ACR, with the leadership of Charles Williams, MD, has worked with the ASRT to develop and bring forward the concept of RAs. The ASRT provided financial grants to four schools (Loma Linda University, Midwestern State University, the University of North Carolina, and the University of Medicine and Dentistry in New Jersey) to establish RA educational programs. Eight other programs are in the process of forming. The scope of practice includes patient management, fluoroscopy for noninvasive procedures, tube placement in uncomplicated patients, selected peripheral venous procedures, assistance during interventional procedures, and communicating the reports of radiologists' findings to referring physicians. Image interpretation is specifically excluded.

A certification program for RAs is being developed by the ARRT. The ARRT was created in 1922 through the combined efforts of the American Roentgen Ray Society and the Radiological Society of North America. In 1942, the ACR assumed the responsibility from the Radiological Society of North America of appointing physician members to the ARRT's governance board, with the ASRT appointing technologist members. Edward Bluth, MD, president of the ARRT, discussed the development of the RA certification process. He reaffirmed that ARRT-certified RAs would be supervised by radiologists and would not engage in image interpretation. Central to the ARRT certification process are standards of education, professional ethics, and an examination.

Although it is generally agreed that the use of physician extenders will make radiologists more productive, Wilbur Smith, MD, and Kimberly Applegate, MD, addressed how the employment of physician extenders would affect resident and fellow training programs. They reviewed experiences in other fields, especially anesthesiology, and described published reports in radiology [13].

Hospitals with residency training programs have preferred to use residents rather than PAs or NPs. The resident costs are paid by the CMS. Even if residents' salaries are paid by hospitals, the salaries of house officers are significantly lower than those of PAs or NPs. Furthermore, residents typically work much longer hours than these physician extenders. However, the new rules on work hours for house officers are reducing that advantage, and it is increasingly recognized that many of the tasks performed by them have little teaching value. Thus, hospitals are often forced to hire more physician extenders to perform a number of necessary duties.

The effect of these extenders on resident and fellow education is likely to be positive. By performing repetitive tasks previously done by radiology faculty members, extenders free time for faculty members to give educational conferences. Furthermore, they relieve house officers of mundane tasks that have little educational value. In many cases, RAs are effective in educating house of-

ficers, because they have large clinical experience and more time to teach than radiologists.

ACR legal counsel William Shields, JD, reminded us that physician extenders may be people from a variety of backgrounds, such as technologists, nurses, PAs, surgical assistants, and others. These nonphysician practitioners constitute a growing share of the workforce and are responsible for 1% of all Medicare Part B services.

The restrictions on resident work hours have a significant economic impact on health care providers, especially hospitals. If a resident with an annual salary of $45,000 works 56 hours per week, his or her hourly wage is $16.00. Nonphysician providers who earn an annual salary of $65,000 and work an average of 44 hours per week receive an hourly wage of $28.00. Thus, a reduction in resident work of only 10% would require an additional annual expenditure of $800 million nationwide.

The regulation of nonphysician practitioners is primarily from the individual states, which jealously guard their authority over licensing, the scope of practice, supervision requirements, medical liability, and radiation safety. They are unlikely to cede authority or control to other organizations. Furthermore, organizations such as the American Board of Medical Specialties, the Accreditation Council on Graduate Medical Education, and the American Hospital Association have been silent.

It is not clear whether it is preferable to hire physician extenders as employees or as contractors. Radiologists have more oversight and control of employees. However, there is also increased liability for employees' acts, which may increase malpractice expenses. Creating independent-contractor arrangements may limit financial liability but could also lead to more independence, defection to other medical specialties, or direct billing by extenders for image examination performance and interpretation.

The ACR's president, William Thorwarth, MD, described how the mechanisms by which radiologists and facilities are paid for their services add another degree of complexity to the use of physician extenders in radiology. Payments for medical care have been determined by a resource-based reimbursement system since 1992. Medicare sets its fee structure with a formula multiplying RVUs by a conversion factor, which is adjusted annually. (This payment is also affected by the geographic practice cost index.) The professional component of the reimbursement is a sum of the RVUs assigned to work done by a physician, the practice expense, and malpractice expense. New procedures are assigned Current Procedural Terminology codes and presented to the American Medical Association's Relative Value Update Committee. The factors considered in determining the physician work component include physician time, mental effort and judgment by the physician, the technical skill and physical effort expended by the physician, and the psychological stress arising from the risk for an adverse outcome. Physician work does not include services provided by support staff members, who do not bill separately, because these are included in the practice expense component. Practice expense is composed of both direct (nonphysician labor, equipment, and medical supplies) and indirect (administration, rent, and utilities) expenses. These practice expenses are site specific. Direct expenses, including nonphysician clinical labor, incurred in an office setting are included in the RVU calculation but are excluded when done in a hospital setting, because those costs are paid by the facility.

Both the CMS and the ACR believe that diagnostic procedures are safe and effective only when furnished with appropriate physician supervision. The CMS has codified three levels of physician supervision required for reimbursement on the basis of the type of procedure. Personal supervision means that a physician is in the room during the key portions of a procedure. Direct supervision occurs when a physician is in the immediate area but not in the examination room. General supervision means that the physician is responsible for the overall direction of an examination but is not physically present. If a physician extender performs some of the work valued as physician work, a radiologist would have to use a "reduced-service" modifier in billing for the supervision of the examination.

Congress has mandated that the Medicare fee schedule be reviewed every 5 years to address potentially overvalued or undervalued Current Procedural Terminology codes. (The next review will begin in 2005 for implementation in 2007.) If it is found at that time that significant portions of the work previously done by radiologists are now being done by extenders, it is likely that the work RVU would be reduced. The magnitude of this reduction may affect decisions by radiologists to employ these extenders.

The participants of the Intersociety Conference reached several conclusions as a result of their intensive discussions. There is general agreement that physician extenders are needed to help radiologists meet the rising demand for their services. Although formal training for these physician extenders is preferred, there are several potential pathways.

The ACR and ASRT have recommended a 4-year RA training program. Many technologists may be able to complete the program in 2 years if they already hold ARRT certification. Documentation of continuing medical education will be required to maintain the registration of RA credentials. Conference participants recommended that the certification be time limited. Physician assistants or NPs may receive additional training specific to radiology to become effective physician extenders for

radiologists. Such training generally would be less than 1 year in duration. A third group of radiologist extenders would emerge from technologists working in other areas of radiology. These include ultrasound practitioners, APNMTs, and dosimetrists. Still other physician extenders for radiologists may have no formal training but receive focused instruction for limited responsibilities such as film hanging, volume navigation (CT or MR), contrast media injections, or patient education. The conference participants felt that image interpretation by radiology physician extenders is not appropriate.

The ability of physician extenders to bill for procedures may be desirable. This would be most useful for specific "tedious" procedures that are unlikely to be associated with serious complications. In the case of PAs, these are billed at only 85% of the normal fee, but they free radiologists from repetitious tasks to perform other duties. However, attendees recognized that a risk in extenders engaging in these activities might be to encourage them to seek independence or make them more susceptible to recruitment by nonradiologists. Antitrust law, the primary purpose of which is to encourage competition, may favor these physician extenders if they seek independent practice.

RECOMMENDATIONS

Patient safety and quality patient care are our foremost considerations. These are best accomplished when radiologist extenders function under the guidance of qualified radiologists. With this as a guide, the participants of the Intersociety Conference offer the following actions and recommendations:

1. The participants of the Intersociety Conference endorse the ACR-ASRT "Joint Statement on Radiologist Assistant Roles and Responsibilities."
2. Standards for accreditation of training programs and certification of individuals should be national.
3. Although we acknowledge that other pathways for radiologist extenders already exist, we expect additional training for those who lack radiology-specific skills.
4. The ACR should carefully review the financial implications of radiologist extenders.
5. The ACR should assess the cost implications of radiology-specific training programs for radiologist extenders.
6. The ACR should continue to provide model legislation for radiologists working with state legislators.
7. All image interpretation should continue to be done by radiologists.

Furthermore, the participants of the Intersociety Conference submit the following resolution to the Council of the ACR:

Whereas there is potential for improvement in patient care and efficiency through the use of radiologist extenders, and whereas radiology and radiation oncology services are best performed under the guidance of qualified radiologists and radiation oncologists, be it resolved that the ACR participate only with physician extender organizations that agree to jointly design

- scope of practice delineations;
- the level of radiologist oversight; and
- education, certification, licensure, and privileging guidelines.

Be it further resolved that quality patient care is best accomplished when radiologist extenders function under the guidance of qualified radiologists, nuclear physicians, and radiation oncologists.

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