WHITE PAPER

Closed-Loop Radiology

Managing the Order-to-Results Delivery Cycle for Improved Diagnostic Imaging Utilization, Documentation and Patient Care.

NUANCE

CONTENTS

INTRODUCTION

The practice of radiology is wrestling with optimizing the use of high-tech imaging, spiraling costs, decreasing reimbursements, and its role in improving patient outcomes.

With over 1 billion radiology exams performed each year in North America, imaging has nudged out pharmaceuticals as the fastest growing component of medical costs.[1] At a compound annual growth rate (CAGR) of 20%, the overall cost of diagnostic imaging is estimated at well over $100 billion annually in the United States alone.[2] Because the rate of innovation and demand for improved diagnostic testing show no signs of abatement, the appetite for providers and consumers in adopting the latest technology is likely to continue.

As the industry experiences dramatic growth, radiology practices are feeling the effects of increased competition, diminished reimbursement rates and a slowing growth of referral networks. In order to stay abreast of these ever-changing challenges, it is necessary to make more effective use of the data and technology that is available today. Improving services to the referring physician, while improving patient safety, allows a radiology group to set itself apart from competing practices.

The benefits of a new approach to managing the order-to-results diagnostic delivery cycle include:

- Managing high-tech imaging utilization, ensuring appropriate diagnostic image ordering, reducing ordering time and satisfying electronic pre-certification
- Improving workflow for multi-site radiology departments, reducing turnaround time and transcription costs through speech recognition, integrating access to clinical content, simplifying peer-review and incorporating more robust communication tools
- Enhancing patient safety by ensuring and verifying the receipt of critical test result information, boosting the productivity of reporting and ordering clinicians and automating compliance with legal and professional standards
- Analyzing clinical data, validating utilization appropriateness, effectively managing costs, improving overall service quality, improving customer satisfaction rates and offering better medical and business decisions with continuous clinical feedback

As a result of the American Recovery and Reinvestment Act (ARRA) of 2009 and Health Information Technology for Economic and Clinical Health (HITECH) Act, looming pay-for-performance (P4P) initiatives, Meaningful Use requirements, and a general increase in competition among radiology practices, healthcare providers are in search of ways to meet healthcare reform requirements, more effectively manage their practices, and provide better service to referring physicians. Through the use of a closed-loop radiology environment, diagnostic imaging providers will have the necessary tools for improving the overall order-to-results delivery cycle.

This new approach is described in the following pages.

[1] Salganik, M. William. “Boom in medical scans presses health payers.” The Baltimore Sun. 13 May 2007.
[2] Salganik.

APPLYING "SIX SIGMA" PRINCIPLES TO THE RADIOLOGY PROCESS

While manufacturing, logistics and other industries have readily embraced the concept of process management and improvement, healthcare has been slow to adopt these strategies. This approach is sometimes referred to as "Six Sigma," a statistical measurement reflecting a highly-efficient and predictable process—where all outcomes fall within six standard deviations from a performance mean. Organizations take aim at this target by carefully applying Six Sigma methodology to every aspect of a particular process, identifying potential improvements and using "closed-loop" management to continuously apply these improvements in a never-ending cycle.

Six Sigma projects in radiology to date have primarily focused on improving patient flow. These studies center on improving exam times, room utilization, volume per hour, as well as many other operational metrics. But they have not attacked the broader issue of overall cost management, exam appropriateness, clinical documentation workflow, and analysis of clinical data. However, new thinking coupled with advancing technologies can now make this a reality.

Focus Areas for Improvement

In radiology, the direct and indirect "waste," which can be eliminated includes:
- Unnecessary imaging tests
- Unnecessary spending on imaging reimbursement and materials
- Unnecessary use of and exposure to radiation-generating materials
- Delays in turnaround time and excessive transcription costs
- Adverse medical events caused by radiology errors
- Delays in developing and deploying treatment plans due to delays in results delivery
- Unused, unstructured, unorganized clinical data

The areas to be measured for improvement include:
- Appropriateness of high-tech exam ordering by diagnosis groups and by individual physician
- Cycle time from ordering to dictation to delivery
- Accuracy of interpretation via peer review and validation
- Transcription costs
- Critical test result management (CTRM) and communication
- Patient outcomes and results reporting

Closed-Loop Radiology: A Process-Centric View

Six Sigma improvement approaches can be deployed if diagnostic imaging views its operations *as a single, closed-loop process.* Adopting a closed-loop radiology approach allows a department to integrate separate processes and brings together these elements in a single workflow:

- **Step 1:** Appropriate high-tech image order placement and pre-certification
- **Step 2:** Multi-site workflow orchestration with real-time dictation and communication of diagnostic imaging results via speech recognition
- **Step 3:** Guaranteed, immediate delivery of critical test results (CTRs) for critical patient findings
- **Step 4:** Analysis of departmental data for business and practice improvements

Like any process, closed-loop radiology can significantly benefit from an ongoing, data-driven analysis of its performance to achieve continuous improvement. Furthermore, when searching for a technology provider it is important to work with an established leader. Seeking an experienced vendor that can support your needs as they change will ensure a successful implementation of a closed-loop radiology process.

IMPROVING HIGH-TECH DIAGNOSTIC IMAGING UTILIZATION AND APPROPRIATENESS

A significant percentage of imaging spending may be unwarranted. While there are no peer reviewed statistics available, experts assert that the problem does in fact exist. The reasons are well-known—physicians worry about malpractice lawsuits, are not aware of the appropriate use of rapidly-developing technology, and must face increasing patient demands. Furthermore, an unfortunate truth is that some providers may boost utilization in order to pay off investments in high tech equipment. These potentially medically-unnecessary exams undoubtedly inflate the rising costs of the U.S. healthcare system. In fact, high-tech imaging now accounts for 60 percent of radiology costs and 80 percent of cost increases.[3]

As a result, healthcare payors are ever tightening the requirements for pre-authorization, and as such, traditional Radiology Benefits Management (RBM) companies act as gatekeepers for those physicians who order appropriately. However, the immediacy for "control" is not unwarranted. The need for clinical ordering appropriateness is substantiated by the fact that an estimated $2 billion to $16 billion is wasted on unnecessary radiology procedures each year.[4]

One challenge has been the lack of a commercially available, research-driven guide for physicians on how to qualify the appropriateness of exams for patients; one that is based on a retrospective analysis of ordering patterns and outcomes. Recently, new applications have entered the market which provide ordering clinicians a zero-penalty approach for placing high-tech diagnostic tests and offers healthcare payors the benefit of proper utilization.

The benefits of decision support are far reaching. In addition to referring physicians, the patient population benefits from the added security of the appropriate order being placed the first time around, lessening unnecessary exposure to excessive radiation. It is reported that Americans are exposed to six times more radiation from medical imaging devices today than just two and a half decades ago. According to preliminary results of a report by the medical subgroup of the National Council on Radiation Protection & Measurements (NCRP), the amount of radiation that the U.S. population receives from medical imaging has risen 750 percent in the last 25 years.[5] Ensuring that exams are performed in the timeliest and most effective manner possible while being cognizant of health implications to patients is an important part of good medicine.

State-wide initiatives are already taking place. For instance, the Institute for Clinical Systems Improvement (ICSI), a nonprofit organization whose members include 60 medical groups and six sponsoring health plans throughout Minnesota and surrounding states, has licensed an electronic clinical decision support solution to support a statewide initiative to help ensure Minnesotans only receive medically appropriate high-tech (MRI, CT, PET and nuclear cardiology) diagnostic imaging (HTDI) tests. This initiative, the first of its kind in the country, is expected to save the Minnesota healthcare community more than $28 million annually.[6]

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[3] *Salganik.*

[4] *DuBose, Jane. "Health Plans Plot How to Rein in Radiology Costs." Health Leaders, Inc, 2005; 5:1.*

[5] *Mettler, Fred A. "Magnitude of Radiation Uses and Doses in the United States: NCRP Scientific Committee 6-2 Analysis of Medical Exposures." National Council on Radiation Protection & Measurements. Arlington, Virginia. 16 April 2007.*

[6] *November 8, 2010, Press Release, Nuance and Minnesota's Institute for Clinical Systems Improvement (ICSI) Spearhead the First Statewide Effort to Help Ensure Patients Receive Appropriate High-Tech Diagnostic Imaging Tests.*

To review, the benefits of this system are shared by patients, providers and payors alike:

Patient Benefits

- Eliminates the ordering of unnecessary diagnostic imaging exams
- Ensures the most appropriate order is placed the first time around
- Reduces unnecessary radiation exposure and improves patient care

Provider Benefits

- Improves the ordering practices of referring physicians
- Satisfies pre-certification requirements of payers
- Eliminates RBM calls
- Educates referring physicians when attempting to order low utility exams
- Monitors ordering patterns of referring clinicians and manages modality utilization trends

Payor Benefits

- Saves financially by reducing inappropriate, high-tech studies
- Provides consistency of ordering among groups and individuals

More and more insurers are accepting this decision support solution as a proven form of pre-certification for reimbursement. As a result, a growing number of hospitals and imaging providers are experiencing significant cost savings, time savings and improvements in patient care.

Case in Point: Optimizing High-Tech Imaging Use

Since 2004, Massachusetts General Hospital (MGH), a member of Partners Healthcare, has been working to address the issue of inappropriately ordered exams.

MGH developed a set of rules with the American College of Radiology (ACR) Appropriateness Criteria® as a foundation. Expanding upon the existing rules, MGH developed more than 15,000 clinical guidelines over a two year period to assist with ordering high-tech imaging procedures. The rules are regularly updated to reflect changes in imaging techniques, research developments, quantitative analysis of patient data and qualitative feedback from referring physicians.

The ordering physician enters the patient's information into the clinical decision support system and selects the desired exam. RadPort® (Nuance Healthcare, Nuance Communications, Boston, MA) gives the desired exam a utility score that rates the appropriateness of each order. The physician verifies the appropriateness of the exam, receives recommendations from the system about more diagnostically appropriate exam choices and ultimately makes the final decision as to which exam is ordered, thus, providing accuracy, convenience and guidance. Business efficiency is a valuable by-product.

ACCELERATING TURNAROUND TIME, REDUCING TRANSCRIPTION COSTS AND INTEGRATING WORKFLOW VIA SPEECH-DRIVEN DOCUMENTATION

The next step in closed-loop radiology workflow that must be addressed is speech recognition, structured reporting and integrating quality enhancement tools.

The role of speech recognition in radiology continues to evolve as financial pressures rise and the shortage of qualified medical transcriptionists is fueled by an aging and growing population.[6] Just a decade ago, speech recognition was a cutting-edge technology. Dramatic accuracy improvements have led the way to greater clinical adoption and widespread use. Today, 1 in 3 radiologists use the technology on a daily basis.[8]

As the capture, storage and transfer of images has become digitized, the pressure to provide results more quickly has increased. It is well-documented that report turnaround times decrease with speech recognition, often times by more than 90%.[9] Main Line Health (MLH) Radiology in suburban Philadelphia, PA, is just one of many examples. This nine-location facility experienced an 84.8% reduction in turnaround time through the use of speech recognition, decreasing the dictation-to-delivery cycle from 23 hours to just 3.5 hours for nearly 500,000 exams per year.[10]

Implementing speech recognition as part of a closed-loop radiology environment yields significant additional financial benefits as well. On average, customers of the market-leading speech reporting solution for radiology state that they achieve more than 85% reduction in transcription costs and generate a payback in under 12 months. Many customers of this solution achieve 100% "self-editing" utilization by their radiologists, which translates into a corresponding 100% reduction in ongoing transcription costs. For instance, speech recognition technology has allowed Crozer-Keystone Health System in Springfield, PA to generate over $700,000 per year savings on transcription costs alone.[11]

While saving on transcription costs and improving turnaround times are significant effects of using speech recognition technology, the potential to bring other productivity enhancing tools to the radiologist's reporting application is frequently overlooked. It is this time savings and added benefit of data capture, integrated clinical content, and peer review tools that are necessary for a radiology practice to remain current and competitive.

In some situations, a radiology practice may consist of multiple disparate systems, with, for example, more than one Radiology Information System (RIS), Picture Archiving and Communication System (PACS), or Advanced Visualization (AV) system. As a result, workflow is often challenging and reporting becomes a daunting task since these disparate systems are rarely integrated on a single platform. Closed-loop radiology brings together these separate components to orchestrate workflow and empower radiologists with the ability to generate reports from a single worklist. Acting as the central steering agent, integrated reporting must connect to multiple RIS, PACS and

[7] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2006-07 Edition*, Medical Transcriptionists.
[8] Customer Data. Nuance Healthcare, Nuance Communications, 2008.
[9] Mardini, Michael J. and Amit Mehta. "Voice Recognition." In *PACS: A Guide to the Digital Revolution, Second Edition*, 482. New York: Springer, 2006.
[10] Schildt, Sharon. "Something to Talk About." Health Management Technology. 1 September 2007.
[11] Fallati, Donald. "Case Study: The Science of Speech." RT Image. 9 January 2006.

AV products. Working in this environment not only saves a significant amount of time, but also reduces errors by eliminating the manual processes associated with order and report routing.

As referring clinicians demand faster, more accurate interpretations from radiology, practices must be prepared to deliver reports that are detailed and concise, independent of the interpreting radiologist. One way to provide these desired results is through structured reporting and speech recognition. Implementing standardized report templates based on CPT codes, auto-populating report content such as patient indications captured from order entry and integrating external data capture will assist in this endeavor. Combining technologist data entry with that of front desk staff will further assist with integrating the data environment. One such example of the need for data collection is emphasized in a radiation exposure study published in the *British Journal of Radiology*.[12] The research reveals a requirement to utilize and carefully monitor dose administration. Through closed-loop radiology and front-end data entry, radiology practices can collect the necessary information for improving overall care.

With most radiologist tasks originating from the reporting application, peer review is another natural extension of the closed-loop reporting process. Professional peer review is mandated by the Joint Commission and such a process should adhere to standards guidelines, such as the American College of Radiology (ACR) RADPEER™ process. Furthermore, the peer review database is acknowledged as a potent instrument whereby all radiologists in the department can learn from mistakes and discrepancies made by themselves and their colleagues. It can also serve as a prompt whereby concern can be raised about the performance of an individual radiologist in respect to a particular type of activity.[13]

Even with these processes in place, institutions and facilities are struggling to meet this requirement as traditionally non-integrated healthcare environments often fail to foster adoption of the peer review process. By automatically retrieving a patient's clinical information and displaying prior reports with his/her associated images, the process becomes a natural component of daily routine. Approaching peer review as an integrated course of action increases the ability to meet and exceed regulatory standards, and more importantly, improves the quality of care.

Quality patient care does not end at the reporting stage. With medical information doubling every decade, even the most experienced radiologists occasionally consult medical reference literature, especially when presented with challenging cases.[14] However, access to information is not always as easy as it could be. In closed-loop radiology, context-aware clinical content is provided instantaneously to the radiologist as an integrated part of the reporting workflow. This wide range of integrated productivity tools is an integral part of the entire closed-loop radiology process and the pinnacle of truly functional radiology reporting.

[12] Warren-Forward HM, Haddaway MJ, Temperton DH and IW McCall. Dose-area product readings for fluoroscopic and plain film examinations, including an analysis of the source of variation for barium enema examination. *The British Journal of Radiology*, 71 (1998); 961-967.

[13] Donnelly LF, Strife JL. Performance-based assessment of radiology faculty: a practical plan to promote improvement and meet JCAHO standards. AJR 2005; 184:1398 -1401.

[14] Clinical Decision Support. Amirsys STATdx, 2008. http://www.amirsys.com/statdx.php (accessed March 10, 2008).

GUARANTEEING CTRs

The value of radiology is not only in the interpretation, but also in the timely delivery of results. The importance of imaging in downstream care and patient safety has raised awareness of the significance of guaranteed critical test results delivery. CTRs typically account for only a small fraction of the output of a hospital radiology or cardiology department, but pose the highest threat to patient safety. On any given day, it can be a roll of the dice whether communication of a critical result goes smoothly or disastrously—or happens at all.

A growing number of hospitals and health systems now see CTRM as a strategic pathway to greater patient safety, better patient outcomes and higher staff productivity. While diagnostic clinicians have remarkably powerful tools at their disposal to identify disease processes, communicating critical test results in a timely manner remains a dangerously weak link in healthcare. It is a longstanding problem contributing to accelerating costs and less than optimal outcomes.

Studies such as one completed for the Florida Radiological Society confirms that communication delays, failures, and errors account for a shockingly high proportion of medical malpractice claims against radiologists. The study indicates that *nearly 75% of the claims against radiologists stem from communication errors*.[15] Clearly, the diagnostic value of radiology now relies on more than just the radiologist's skill at interpretation; delivery must also be radiology's responsibility.

Another recent study involving the Physicians Insurers Association of America reveals that *the delay or ineffective communication in diagnosis of breast cancer resulted in malpractice awards twice as high as when effective communication was employed.* Indemnity payments were 15-fold higher as a percentage of the total awards to plaintiffs due to miscommunication.[16]

CTRs are subject to systematic errors partly because of the large numbers of tests that are ordered, the relative infrequency of urgent results that require immediate attention, and the lack of direct consultation in the ordering of such studies. Unless the diagnostic ordering, interpretation and results delivery process is integrated, managed and continuously evaluated "end-to-end" in a single workflow, patients will remain at risk for incomplete and/or undelivered test results, leading to the overall increase in the cost of imaging due to inappropriate utilization of high cost test procedures.

[15] Berlin, Leonard. "Malpractice Issues In Radiology, Communicating Findings of Radiologic Examinations: Whither Goest the Radiologist's Duty." *American Journal of Roentgenology*, 2002; 178: 2.
[16] Berlin.

The Joint Commission, reacting to the challenge of how to address urgent patient findings, issued a new, broader results communications standard on January 1, 2004. The standard and National Patient Safety Goals state:

Goal 2 Improve the effectiveness of communication among caregivers.

- **2A** For verbal or telephone orders or for telephonic reporting of CTRs, verify the complete order or test result by having the person receiving the information record and "read-back" the complete order or test result.
- **2B** Standardize a list of abbreviations, acronyms, symbols, and dose designations that are not to be used throughout the organization.
- **2C** Measure and assess, and if appropriate, take action to improve the timeliness of reporting, and the timeliness of receipt by the responsible licensed caregiver, of critical test results and values.
- **2E** Implement a standardized approach to hand off communications, including an opportunity to ask and respond to questions.

In plain language, getting the diagnosis right is only half the battle for a radiologist or other diagnostic clinician, according to the Joint Commission. Health care providers have not done their job unless the communications loop is closed and error-free.

Fortunately, affordable, user-friendly technology for managing the process of delivering and verifying clinical communications has been available since 2004, and a growing number of hospitals are embracing it. Hospital administrators and radiology managers must ensure that diagnostic clinicians have the systems necessary for the timely communication of critical test results, and administrators must be able to measure individual and institutional performance against established goals. For example, VCU Health Systems, an academic medical center and Level 1 trauma center, decreased critical result communication time from one hour to just 16 minutes as well as increased the number of radiology exams processed annually by implementing CTRM technology.[17]

CTRM offers reporting clinicians "one-call-does-it-all" simplicity and also ensures that a result has been retrieved by the responsible ordering clinician. A reporting clinician creates a message from a phone or computer, and CTRM does the rest: alerts the ordering clinician that the result is pending; indicates the urgency of the result (i.e. sends alerts until the message is retrieved; escalates the notification according to pre-set rules; sends a verification to the reporting clinician when the message has been retrieved), all while documenting the entire communication process to support audit and survey requirements. As a result, CTRM leads to quality enhancements in the closed-loop radiology cycle.

[17] Customer Data. Nuance Healthcare, Nuance Communications, 2009.

ANALYZING OUTCOMES, IMPROVING BUSINESS DECISIONS AND CLOSING THE LOOP

The final step of closed-loop radiology involves data management. The amount of data that a radiology department accumulates is growing rapidly. From 2001 to 2003, the total count of CT procedures administered in the U.S. increased from 39.6 million to 57 million, a 79.2% increase during a two year period.[18] It is evident that as the use of diagnostic imaging expands year-over-year, so does the amount of data that radiology practices generate.

The questions become: How do we collect data? How do we store it in an accessible fashion? And what do we do with it once we have it? It is this ability to continuously monitor data that is the missing link in most modern radiology departments.

The answers begin with the accessibility and consumption of the data itself. This involves compiling information collected during the first three stages of closed-loop radiology: ordering appropriateness ratings (decision support), radiology reporting metrics, peer-reviewed data, critical communications, and other external data sources.

Bringing together this massive collection of values into a central location is quite possibly the biggest challenge. However, extracting information from a variety of "closed architecture" databases and building a warehouse of usable content is the key to success. Even so, it is not just simply compiling the data that brings understanding to the information; it is optimization and robust visualization that promotes better business decisions and practice management.

Data optimization starts with the central repository of clinical information. Natural Language Processing (NLP) plays a fundamental role in structuring the unstructured data and classifying the output. This sorting process provides optimum accessibility so that data manipulation is possible. The key to fulfilling this component of closed-loop radiology involves the use of an automated classification agent. One such structuring algorithm designed specifically for the radiology domain is Lexicon Mediated Entropy Reduction (LEXIMER). LEXIMER boasts an accuracy rate of 97.5%, a sensitivity rate of 94.9%, a specificity rate of 97.7%, and positive and negative predictive rates of 99.6% and 99.7%.[19]

Once the data is prepped, an easy-to-use front-end interface with visualization capabilities is an essential part of the analytical process. Providing data manipulation without the complex knowledge of programming stimulates mass appeal and acceptance. This type of setup is imperative because it empowers more users to conduct data analysis.

As the collection of data continues to increase, the need for more educated participants in the analysis process grows. In this post-DRA era, practice management has become a vital part for ensuring quality and efficiency across all facets of the medical domain. Addressing the sizable effects of the DRA and P4P initiatives, healthcare facilities are seeking assistance from these powerful analysis tools.

[18] DuBose.

[19] Dreyer, DO, PhD, Keith J., Mannudeep K. Kalra, MD, DNB, Michael M. Maher, FFR (RCSI), MD, FRCR, Autumn M. Hurier, BS, Benjamin A. Asfaw, MHSA, Thomas Schultz, BS, Elkan F. Halpern, PhD and James H. Thrall, MD. "Application of Recently Developed Computer Algorithm for Automatic Classification of Unstructured Radiology Reports: Validation Study." Division of Computing and Information Services, Department of Radiology, Massachusetts General Hospital and Harvard Medical School, 2004.

How does managing the data relate to other components of closed-loop radiology? A data-driven environment allows radiology departments to:

- Better manage utilization by not only maintaining the up-front guidance, but also by analyzing the back-end tracking of individual and group order appropriateness rates
- Monitor the effects of education on appropriateness ratings and trends
- Properly capture patient indications for inclusion in the radiology report and clinical priority
- Capture custom data values during the interpretation process to automate reporting and facilitate technologist workflow and patient dose tracking
- Provide structured reporting tools and quality assurance instruments
- Monitor and audit critical patient findings and communication response times
- Track outcomes and identify what is actually happening with a specific patient population for continuous improvement
- Calculate exam volume, patient wait times, report turnaround times, report consistency, RVUs, productivity, and dictation patterns

CONCLUSION/RECOMMENDATIONS

The enormous shadow diagnostic imaging casts over treatment plans and associated costs has led to increased scrutiny on its appropriateness and level of service to referring physicians.

By managing radiology as a single, end-to-end or closed-loop process, from ordering to results delivery, the practice of radiology can drive continuous improvement through the use of information technology at each stage and through the historical analysis of monthly, quarterly or annual patterns.

The benefits of closed-loop radiology go beyond saving time, money, and resources and extend to patient safety and care along with better clinical documentation. Each step in the closed-loop radiology process works in harmony with the next to provide a foundation for continuously improving the responsibilities of this sector of the medical community.

Proper understanding of data is the only way to truly justify business decisions. Employing the specifics of closed-loop radiology make what was once a daunting task an achievable reality. From beginning to end, the use of a closed-loop radiology environment will allow diagnostic imaging providers the opportunity to improve the overall order-to-results delivery cycle.

WHAT TO LOOK FOR IN A SOLUTIONS PROVIDER

When looking for a company to provide an integrated end-to-end radiology solution, be sure to consider the following requirements:

Minimal impact on existing systems: Seek a provider who can implement solutions without disrupting the functionality of your existing systems, reducing the need to significantly alter workflow or abandon previous investments.

Integration expertise with radiology applications: In order to minimize the impact of integrating new solutions, seek a provider who possesses extensive experience integrating clinical decision support systems, speech recognition and communication applications, in addition to data mining solutions.

Automates manual procedures: In order to provide the highest level of productivity and efficiency, look for a solution that replaces manual processes. This will ensure the timeliness and quality of documentation while reducing susceptibility to human induced errors.

Extensive support offering: Search for a company who possesses financial stability and proven support capabilities. The desired company should provide an in-depth analysis of workflow and your environment, fully understand deployment strategies, offer detailed documentation, on-site and distant training, and local and remote support.

Strategic relationships within the radiology industry: Engage with providers who possess strategic relationships within the radiology industry. It is important to work with a company with established relationships with a wide range of CPOE, RIS, PACS, and Advanced Visualization providers. This will ensure efficient integration with your existing technology investments.

Proven market experience: The ideal company should have market experience with healthcare documentation and communication, including extensive experience with speech recognition implementation. Market experience should include installations at the nation's top 100 hospitals (Solucient), honor roll hospitals (US News & World Report), top connected healthcare facilities (Health Imaging & IT), and extensive market knowledge with imaging centers, community hospitals and academic teaching facilities of all sizes.

THE NUANCE HEALTHCARE ADVANTAGE

Nuance Healthcare, a division of Nuance Communications, offers advanced end-to-end speech recognition and intelligent clinical documentation and communication solutions and transcription services. These solutions transform clinical observations and medical decision-making into structured, actionable information, enabling healthcare organizations to improve financial performance, enhance patient care and increase patient safety.

To maximize your practice and explore end-to-end radiology solutions, please call **1.800.350.4836** or visit **www.nuance.com/healthcare.**

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