HEALTHCARE SHIFTS DRIVING CHANGE IN IMAGING SERVICES

There are many challenges facing healthcare provider organizations in today’s environment. These include taking advantage of ongoing consolidation, enhancing the quality of care and patient outcomes, optimizing departmental service lines, and managing referral streams and population health.

Medical imaging and its radiology anchor are continuing to evolve into enterprise imaging service lines while seeking ways to improve productivity, quality, costs, physician value and patient experience. Imaging providers are actively deploying IT solutions and services to help meet current needs, but also to evolve and carry them into the future.

Case Studies
Frost & Sullivan interviewed three provider organizations of very different nature—an integrated health system, a private group practice and an academic—to discuss how their organizations have strived to overcome some of the challenges in the market facing radiology practices and departments. The selected case studies include:

- **MedStar Medical Group Radiology (MMGR)**, the radiology arm of MedStar Health, the largest healthcare provider in the Maryland/Washington D.C. area.
- **Medical Diagnostic Imaging Group (MDIG)**, a professional radiology services enterprise and one of the 50 largest private radiology practices in the United States.
- **Weill Cornell Medicine Department of Radiology**, a leading academic medical center, part of Cornell University, which provides imaging services at four New York hospitals and seven outpatient imaging centers.

KEY FINDINGS

**Moving from Today to Tomorrow**
All three organizations sought to overcome various market challenges they were facing head on. Solutions included new IT investments including an enterprise imaging platform with advanced workflow orchestration capabilities. The investments successfully addressed various issues facing each organization, which varied between the health system, the group practice and the academic center.
How MedStar Health Standardized its Subspecialty Coverage System-Wide
Leveraging Workflow Orchestration to Disseminate Subspecialty Expertise across the Enterprise

LOOKING BACK FIVE YEARS AGO
A Legacy of Siloes

If one looked at the radiology operations of MedStar Health just 5 years ago, the picture looked radically different than it does today. “We were very silo’ed, both in technology and professional service,” says Steven H. Brick, MD, FACR, Physician Executive Director for MedStar Medical Group Radiology (MMGR), the radiology arm of MedStar Health, as he reflects on the situation when he joined the organization back in 2013.

At that time, there were 7 distinct radiology practices providing professional radiology services to the 10 acute care hospitals comprising the MedStar network. The radiologist resources were a very hybrid mix of independent contractors, private practices and employed academic physicians. Some radiologists were even employed by competing healthcare systems.

The same fragmented environment prevailed on the information technology (IT) front. The different radiology practices used 9 disparate PACS systems, 5 different RIS systems and 5 different radiology reporting systems, which would hardly communicate with each other.
Accordingly, MedStar’s radiologists read almost exclusively for their own facility using the local PACS, with the exception of a few radiologists reading from their local hospitals for at most one additional hospital, when studies would be ‘pushed’ from one hospital to another. “We had a jury-rigged IT system, and had no way to load-balance the workload across the system,” Dr Brick concedes. “The groups wouldn’t necessarily cover for each other. For example, if one hospital was slower at a given time and another one was busy, there was no way for the radiologist at the slower hospital to help out at the busy hospital, especially since they were usually employed by different entities.”

A KEY IMPERATIVE
Bridging the Siloes

As the radiology practices consolidated within MedStar, the absence of load-balancing capabilities had revenue implications as well, since not all radiologists would have the opportunity to work at-capacity. This also affected office-based radiologists where volumes might be lower than in the hospitals, or in new offices where volumes take time to ramp-up.

The fragmented IT ecosystem also came in the way of integrated patient care. For instance, if patients moved around the region or showed up at a remote emergency room, their prior imaging records would not be readily accessible, even within MedStar’s coverage area.

Perhaps the greatest prospect was reducing the variability in the level of sub-specialty expertise that MedStar Health would deliver across its network. MedStar felt hard-pressed to be able to provide, throughout the entire system, the same quality of care it was already practicing at its two tertiary care facilities, namely MedStar Washington Hospital Center and MedStar Georgetown University Hospital. This meant being able to offer sub-specialty reads by sub-specialized radiologists across all of MedStar’s community hospitals, where there may be 3 or 4 radiologists on-site at any given time, or at the ancillary offices and urgent care sites (branded “MedStar PromptCare”), where there could be only 1 radiologist on duty at a given time—compared to 15 or 20 general and sub-specialized radiologists at the large hospital sites.

THE TURNING POINT
Consolidation and Expansion

The decision was therefore made to consolidate radiology practices under the umbrella of MMGR, with all radiologists at 9 of the 10 MedStar hospitals and most of the outpatient imaging centers employed...
by MedStar Health. As Dr Brick explains, “It would have been difficult otherwise for MedStar to meet their goals and standardize their quality throughout the system when everything had to be negotiated with seven different radiology practices.”

Meanwhile, at the system level, MedStar Health continued to implement its community expansion strategy, establishing throughout the region several new multi-specialty physician offices and ambulatory care centers, with radiology often a core component to them.

The consolidation effort on the radiology front, coupled with the expansion on the care delivery front, prompted the next logical steps for MMGR. It became obvious MMGR needed to “bring the technology together,” as Dr Brick puts it, so that its 110 radiologists and nuclear medicine physicians could all work like one unified group, off of one unified platform.

Yet despite the strong mandate and the wide support from MedStar’s IT department, MMGR just “couldn’t do it all at once,” Dr Brick admits. A one-off rip-and-replace of all incumbent PACS systems by a new single-vendor PACS platform was simply not feasible, neither operationally nor economically. MMGR therefore opted for a ‘deconstructed’ PACS approach, starting with a unified workflow orchestration solution and followed by a unified viewing platform, which would allow to gradually and seamlessly phase-out the legacy IT systems in place.

**FAST-FORWARD 5 YEARS**

**Reaping the Benefits**

This modular and phased IT deployment approach ultimately proved highly effective for the organization. With a harmonized imaging informatics technology stack in place, MMGR became able to seamlessly load-balance, and intelligently distribute the radiology workload across the general and specialty radiologist workforce. In essence, the enterprise finally had the tools it needed to make major achievements and support various quality and growth initiatives:

**Subspecialty Reads by Subspecialists throughout the System**

Being recognized for its clinical excellence in many areas including cardiology and cardiac surgery, orthopedics, cancer, transplantation, rehabilitation, and emergency and trauma services, MedStar Health has been able to capitalize on this clinical edge across its entire coverage area. As such, the health system is living up to its “commitment to offer access to imaging specialists across the community,” as Dr. Brick emphasizes, illustrating this newfound capability using a concrete example: “Let’s say we need a neuroradiologist from MedStar Georgetown to read neuro cases for MedStar Georgetown in addition to a few offices and other hospitals. There are lots of different filters we can use,
so that they just work off a combined worklist. It’s seamless.”

**24/7 service Including In-House Night Reads**

The load-balancing capability further enabled MMGR to realize its ambition of becoming a 24/7 service provider without having to externalize any workload, including after-hours reads. In fact, MMGR was able to completely in-source the night coverage function, some of which was previously being outsourced to external third-party teleradiology providers. As Dr Brick explains: “We also have implemented our own internal Nighthawk coverage. Originally each hospital took calls by themselves, and some would outsource to outside teleradiology firms. One of our mandates was to bring all of that business in-house internal to MedStar. That was impossible without having our unified platform in place.”

**Workforce Elasticity and Workload Scalability**

As MedStar Health looks to establish more and more ambulatory locations, in which the on-site radiologist(s) can act as true physician consultant(s) to the local physician team, a key benefit of the unified platform is the ease with which MMGR can now get the radiology service line at these locations up-and-running. “The ease of providing subspecialty coverage makes it possible. It has become very easy for us to absorb these sub-specialty reads under the current workflow,” Dr Brick explains, adding: “With this platform in place, radiologists can be sitting in an office and be reading for hospitals just as though they were sitting at that hospital.”

These factors have major implications for MMGR’s ability to optimize the utilization of its radiology resources. “It enables us to staff more efficiently” Dr. Brick points out, “say if volumes go up in one location, we don’t necessarily need to hire one more radiologist, we can spread these cases around among multiple existing radiologists.” The same applies to the impact on MMGR of unforeseen staffing situations: “If a new office opens up, if a practice cuts down a full-time employee (FTE) due to retirement or relocation, the practice can often absorb the volume of the missing FTE.”

**Quality Initiatives Made Easier**

Among multiple quality improvement projects that MMGR has been able to achieve by leveraging its unified imaging platform, Dr Brick details two pertaining to emergency services which have been hugely successful: “We decided to improve turnaround times for neuroradiology interpretations during after-hours in the emergency department. We were able to assign one neuroradiologist to a late shift working until 10PM, which led to a reduction of turnaround times of 10 minutes.” Along the same lines, given the

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Steven H. Brick, MD, FACR, Physician Executive Director for MedStar Medical Group Radiology (MMGR)
fact that patient images became accessible anywhere in the MedStar network, MMGR could design new processes for improved critical results management. Using an add-on service line from its workflow vendor, MMGR can now ensure that critical imaging findings are managed in-time by the first available radiologist.

AN IMAGING SERVICE LINE FIT FOR THE FUTURE

MedStar Health is quite a big ship to steer. With ten hospitals serving more than half a million patients each year, over 4.6 million outpatient visits across its large community care network, and close to $6 billion in net operating revenue, it is the largest healthcare provider in the Maryland and Washington, D.C. areas and one of the largest in the Mid-Atlantic region. With the right leadership and technology in place, the not-for-profit organization realized major accomplishments on the radiology front. MMGR now pilots an imaging service line that is completely aligned with MedStar Health’s direction and ambition. “It’s been a journey” Dr Brick concludes, as he reflects on the last five years’ efforts, while contemplating the many more initiatives that lay ahead.

PAST CHALLENGES

7 DISTINCT radiology practices
9 PACS, 5 different RIS and 5 reporting systems, all disparate
HYBRID MIX of independent contractors, private practitioners, internal and external employees
NO ABILITY to load-balance the workload across the system
VARIABILITY IN the quality of imaging services across the network

THE IMPERATIVE

CONSOLIDATION OF radiology workforce
ALIGN IMAGING service line with MedStar’s community expansion strategy
STANDARDIZED SERVICE level of the imaging service line

THE SOLUTION

LEADERSHIP AND change management initiatives
“DECONSTRUCTED” PACS strategy
WORKFLOW-FIRST, viewing-next approach

TODAY

ONE INTEGRATED radiology enterprise
ONE UNIFIED radiology IT platform
SIMPLIFIED INCREMENTAL quality improvement initiatives
SUB-SPECIALTY reads by sub-specialists throughout the network
24/7 IN-HOUSE delivered service
SEAMLESS ELASTICITY of the workforce and scalability of the workload
Leveraging a Unified Enterprise Imaging Platform to Drive Efficiency and Scale
MDIG’s Pathway to Building a Best-in-Class Medical Imaging Service Line

OVERCOMING THE CHALLENGES OF PRIVATE RADIOLOGY PRACTICES

For a private radiology practice that strives to offer best-in-class services to its hospital customers, it all boils down to nurturing the radiologist experience and giving radiologists the best tools to succeed. Therein lies the key to attracting and retaining the best talent and to anchoring deeper relationships with customers so as to become their sole, one-stop service provider—including for all their subspecialty needs.

Hospital networks in the United States are consolidating and growing into ever-larger health systems. This has major implications on the external providers that serve them. Radiology service providers must have internal strength and unity to be able to overcome internal politics and build trusting relationships with hospital networks.

“When quality increases, perception increases; trust is built over time,” points out Barry Sadegi, MD, president of Medical Diagnostic Imaging Group (MDIG), a professional radiology services enterprise with more than 70 full-time radiologists. MDIG performs more than 1.5 million diagnostic and interventional radiology services annually, making it one of the 50 largest private radiology practices in the United States.
FIVE YEARS BACK
Internal Inefficiencies

Prior to MDIG deploying its new solution set of enterprise imaging informatics, the practice’s radiologists were constantly juggling 4 different PACS systems. The toolsets varied depending on the customer and location, resulting in variable outcomes and a suboptimal work experience.

This fragmented IT environment hampered radiologists’ ability to provide optimal study interpretations and actionable answers to the clinical question at hand, since they had very limited information at their disposal other than the actual images and basic notes from the imaging technologist.

The need to access physician notes, the patient record, and other relevant information about the patient and the study context led to a recurring “swivel chair” challenge of having to move back and forth between disparate information systems.

“This was highly inefficient; there were opportunities for improvement”, Sadegi says, adding: “We wanted to have MDIG radiologists on one system, so their tools would become integrated into their muscle memory.”

THE SOLUTION AND RESULTING BENEFITS

MDIG found the solution to the disjointed working environment in the use of a unified reading platform coupled with a distributed worklist. MDIG radiologists would utilize these MDIG-provided tools for all their work, regardless of customer or location. This IT investment makes MDIG one of a few radiology groups that provide their professional service out of their own technology, and the strategy has delivered in a big way. Indeed, only two years after going live with these enterprise imaging solutions, MDIG has enhanced radiology services across the board.

Sub-specialization
Making the Difference with Customers

Sadegi believes strongly in the fact that “subspecialization makes the difference” for professional radiology service providers, and is the best way to avoid the perception of commoditization of these services. As such, MDIG has made the increase in subspecialization one of its strategic imperatives. Neuroradiology, pediatric radiology, and musculoskeletal imaging are just a few of the subspecialties in which MDIG continues to deepen its expertise. Sadegi credits the new enterprise imaging solution set for significant contributions in this regard because it allows the intelligent routing of studies among general and subspecialized radiologists, ensuring that the most qualified radiologist is interpreting each imaging study. Internal analysis demonstrated
subspecialization increased the detail of the reports and decreased errors.

The results of MDIG’s workload analysis speak for themselves. Prior to going live with its enterprise imaging solutions, 50% of the neurology imaging caseload was read by specialized neuroradiologists. Now, this proportion stands at close to 90%, and projections indicate that MDIG is on track to reach its goal of 100%.

Partner Engagement
Committing to Fast and Reliable Service

At the heart of any partnership is the commitment to key performance indicators in a service level agreement. Prior to the enterprise imaging going live, MDIG was already meeting its commitments for report turnaround times—an important measure of quality for professional radiology service providers. However, thanks to the operational efficiencies generated by the unified IT solution, turnaround times became even faster, which customers perceive as additional value.

Moreover, the improvement in turnaround times gave MDIG the confidence it needed to commit to an even superior service level. “Not a single late read” is a pledge of reliability to hospital customers that every study is always read on time, which has become part of MDIG’s service level agreement and a pillar of MDIG’s partnership approach.

Productivity Gains
Maximizing the Efficiency of Full-Time Employees

Workflow efficiency has directly affected MDIG’s group productivity. As Sadegi puts it: “Now radiologists can focus on images rather than navigating through multiple different systems.” The group is able to collectively produce significantly more relative value units (RVUs) per day than what it was able to achieve without a unified IT platform. Sadegi estimates that the average number of RVUs has increased from between 40 and 50 per day to between 70 and 80 today. Along the same lines, Sadegi estimates that efficiency gains in the range of 20% to 25% have been realized.

In essence, the enterprise imaging strategy has enabled MDIG to do more with less. The freed-up resource capacity leaves MDIG with two options: either reduce its full-time employee count or leverage its full-time employee base to grow the business. The latter is what MDIG chose to do.

Group Expansion
Growing Toward a National Practice

Until recently, MDIG was a regionalized radiology practice focused on the markets of Arizona and New Mexico. By capitalizing on the scalability of its operating model, in which its enterprise IT investments play an integral role, MDIG is now present in six states and has an ambition of becoming a national practice. The organization is able to expand
nationally on a uniform system while providing the same high-performance level of service.

Most importantly, MDIG is achieving these growth objectives while adding only the minimal number of full time employees necessary to meet on-site staffing requirements, and yet still providing all subspecialty capabilities. Sadegi explains that the enterprise imaging solutions “bring the economies of scale to a whole new level.” In fact, without such technology assets, it is difficult for private radiology practices to counterbalance the persistent pressure on the reimbursement for professional services.

CONCLUSION

MDIG has transformed its IT-powered operational strategy over the last few years. Bundling IT solutions with its professional radiology services gives MDIG a unique competitive advantage. The payoff has been remarkable: “We continue to experience tremendous growth at MDIG,” Sadegi says. “For us, technology is no longer a barrier. We have the foundation that allows us to sustain our growth at maximal efficiencies and quality.”
The healthcare market in the United States is experiencing a tsunami of change, dynamically altering the provider landscape. Consolidation is transforming the make-up of networks and health systems, bringing with it both exciting benefits and challenges. As healthcare providers look to implement strategies and IT investment choices that can enable and support revenue and margin growth, the overarching priority is enhancing the patient experience across the continuum of care.

Providers are trying to be nimble in the wake of change, and as such are focused on finding positive financial, quality and performance measures that can drive optimal results, outcomes and patient experiences. The more progressive provider organizations were quick to realize that the imaging service line can, and must, actively contribute to higher patient loyalty to the system by providing a better patient imaging experience.

“Strategically, it is about adapting to the changing healthcare environment—not only adapting but thriving” states Keith Hentel, MD, Executive Vice Chairman, Department of Radiology at Weill Cornell Medicine, a leading academic medical center, part of Cornell University, “while providing the best care and patient experience.”
CHALLENGES AND IMPERATIVES

For a large academic radiology practice spread across multiple locations, undergoing both organic growth and inorganic transactional changes can result in a variety of challenges. Weill Cornell Medicine provides imaging services at four New York hospitals and seven outpatient imaging centers.

Prior to deploying its enterprise imaging solutions, the network had a dedicated imaging scheduling center for all of its outpatient sites. The IT systems it was using were not delivering optimal performance and outcomes. The staff had to rely on a complex scheduling protocol reference manual to sort out the optimal scheduling of patients for their imaging exams.

Consolidation of existing practices into the group brought with it issues ranging from scheduling inefficiencies, disparate service level agreements, different exam libraries, and difficulty managing the credentials and specializations of various physicians. Each time a new practice was introduced into the organization, the department faced a potentially long and costly IT integration process. Adding a separate image management and dictation system with every new acquisition was clearly inefficient and unsustainable. Reflecting on this process, Hentel stated, “We needed something that could sort these various practices out and allow us to bring on practices in a somewhat facile manner.”

SOLUTIONS AND OUTCOMES

Radiology at Weill Cornell Medicine found solutions to its operational and environmental hurdles through the combination of a common reading platform with a distributed worklist and an integrated referral management solution. The technology investment also has enabled and accelerated various quality improvement initiatives through the use of advanced analytics.

Workflow orchestration yields extensive benefits

The department’s investment in a unified reading platform with a distributed worklist solved a multitude of challenges, issues, and operational points the group was facing.

Ease of New Practice Integration

The IT investments made things easier on the organization on multiple levels regarding changes resulting from growth in scale.

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Keith Hentel, MD, Executive Vice Chairman, Department of Radiology at Weill Cornell Medicine
post transactions. Hentel believes, “It is significantly easier from an administrative perspective, and has significantly improved our agility.” Having all radiologists working from an integrated worklist, regardless of the legacy solutions in place in various locations, considerably enhances the group efficiency as well as the radiologist experience. According to Hentel, this platform has become “the backbone that is allowing us to launch images in a way that our radiologists don’t realize they are from a different system.”

The new enterprise imaging platform has yielded a positive impact on productivity

Productivity Gains and Sub-specialization

The new enterprise imaging platform has yielded a positive impact on productivity, enabling the group to align itself on a uniform service level agreement across the enterprise. The single system approach has allowed Weill Cornell to be adaptable when serving the needs for sub-specialized radiology services across locations, as well as the ability to export that expertise to other hospitals in the community. “The fact that it allows to read from multiple sites on one worklist is very important,” explains Hentel, “We use it for turnaround times for Emergency Department reads; we have different targets for different modalities and we consistently hit our targets.

This is due to in large part in us being able to highlight priority cases on the radiologist worklists.”

Enterprise alignment though IT Integration

For optimal utility and value, correctly integrating departmental IT solutions with enterprise electronic health record (EHR) systems is a critical component of care coordination and healthcare integration. Along these lines, the radiology department at Weill Cornell Medicine has also integrated the imaging IT platform with the enterprise patient portal, leading to substantial time savings related to patient-wait times on the day of their imaging exams. This is achieved, for example, by having patients fill out safety forms online prior to coming into the practice, where their reception can be personalized.

Patient-centered Radiology Services

Weill Cornell Medicine had been using a traditional radiology information system (RIS) for managing imaging exams. With that RIS, it saw some difficulty in getting the optimal context about the patient to the radiologist

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during the read, and saw a lack of ability to easily move useful information about the patient through different encounters. This is because the RIS was viewed as very exam focused. Hentel said, “Traditional RIS systems are great in terms of tracking imaging exams, but when you know things about a patient it is very hard from that information to persist from exam to exam.” Communicating even simple information from point to point, such as name preference, nurse/tech preferences, or vascular access issues, are small factors that can go a long way in creating an optimal experience for a patient.

The department now seeks to follow patients through their journey while incorporating relevant data and information to enable better context and improve the overall patient experience. The new unified reading platform with a distributed worklist actively contributes to this system capability. “One of the big things that set the solution apart from other imaging technology that is out there, is it is very patient-focused as opposed to being imaging exam-focused,” said Hentel. “That may not be an obvious distinction, but it is a big distinction.” Leveraging patient information from the EHR during the read is done to provide optimal context to the radiologist at the time of interpretation. “We pull in info from Epic and display it as part of the patient summary, which has been very important for the radiologists,” points out Hentel.

**Scheduling investment improves imaging services outcomes**

The new integrated referral management solution also helps Weill Cornell’s dedicated imaging scheduling center centralize scheduling for all outpatient imaging sites. “If you look at our schedulers, they are highly efficient. We have a call abandonment rate of about 1%, which is significantly better than the industry standard. This is, in part, because we have effective scheduling technology,” explains Hentel.

Leveraging these new capabilities, the radiology department expanded the referral management solution to performing direct-to-physician online scheduling. It has a future strategic goal to further leverage it to provide direct-to-patient scheduling via a patient portal. It is also being explored in terms of use for inpatient scheduling, a process that is beginning with interventional radiology practices.

**CONCLUSION**

Optimal radiologist workflow directly correlates with productivity, best-practices in case assignment and prioritization, and many other factors that impact provider performance and patient care. The goal of Weill Cornell
Medicine’s Department of Radiology is to provide outstanding patient-centered care overall, using its expertise to drive optimal organizational goals and patient outcomes. In that context, the Department of Radiology has strived to find optimal tools and solutions that enable radiologists to practice at the highest levels and standards, thereby providing outstanding performance for the overall organization—positively and directly impacting patient satisfaction.

**PAST CHALLENGES**
- **DISPARATE SERVICE** level agreement expectations across the group
- **DIFFERENT GROUPS** of physicians credentialed to work at various sites
- **UNMET NEED** for more patient information for study interpretation
- **DIFFERENT EXAM** libraries
- **DIFFERENT ORDERING** priorities
- **NEED TO** improve scheduling performance for outpatient sites

**THE IMPERATIVE**
- **ON-BOARD NEWLY** acquired practices in an easy manner
- **IMPROVE PERFORMANCE** and reduce friction in outpatient scheduling
- **LEVERAGE A** single system for imaging reads and dictation
- **OPTIMIZE STUDY** prioritization with ability to escalate and meet turn-around times in line with best practices

**THE SOLUTION**
- **UNIFIED READING** platform with worklist orchestration
- **SOLID ANALYTICS** capabilities to leverage for quality improvement projects
- **ENTERPRISE INTEGRATED** referral management solution

**TODAY**
- >90% OF post-procedure reads completed within 90 minutes
- **APPROXIMATELY 1%** Call abandonment rates for patient scheduling
- **IMPROVED RATINGS** pertaining to patient experience
- **WELL PREPARED** for seamless scalability in further group expansion
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For information regarding permission, write:
Frost & Sullivan
3211 Scott Blvd
Santa Clara, CA 95054