GROWING YOUR RADIOLOGY PRACTICE: THE ROLE OF SEARCH-DRIVEN ANALYTICS
Background

1. How does radiologist turn-around-time for inpatient head MRI procedures, from exam completion to report finalized, vary across all facilities in our organization?
2. Who are the top referring doctors for PET scans across my institution? What are the trends in referral patterns over the past 3 years?
3. How many patients with renal cell carcinoma have undergone CT-guided biopsy? Do the Radiology findings correlate with the Pathology results?
4. How often are radiologists compliant with critical results reporting policy mandated by the Joint Commission?

Few radiology practices can answer these questions easily. But knowing the answers to these questions and others like them is the key to unlocking your practice’s potential for increased efficiency, clinical accuracy, profitability, and overall growth.

All radiology practices, whether freestanding, hospital-based, or part of an outpatient center, must operate like disciplined businesses to survive and prosper. And like any enterprise, business intelligence and quality analytics are essential to improving performance.

This white paper makes the case for using a business intelligence system with clinical analytics that are search-driven — software that can mine and analyze structured or unstructured radiology practice data using radiology-specific natural language processing. This white paper will review the following aspects of search-driven analytics:

1. Situation Analysis
2. The Importance of Radiology Practice Analytics
3. Choosing Analytics Software: Reporting Features to Consider
4. The Case for Search-Driven Analytics
5. Three Steps for Harnessing the Power of a Search-Driven Analytics Program
6. Reaping Value: A Clear Return on Investment

Situation Analysis

A radiology practice is a business, and running it requires business tools. Indeed, the ongoing decline in reimbursements that began with the Deficit Reduction Act of 2005 has served as a sharp reminder that business tools are as important as medical equipment.

As a result, practice leaders are learning how to refine and improve their business practices. It is no longer just about administering the business day to day, but also about ensuring the health of the business and, increasingly, growing the business in a planned manner. It is no longer adequate to focus on turn-around-time, referrals, and staff productivity without reliable data. Practices are thinking more broadly, not only about the components of exemplary customer service for patients but also about business-to-business best-practices to gain the loyalty of referring physicians and about data-driven, evidence-based methods for improving quality of care.

“Children’s National Medical Center empowers its radiologists to understand their own turn-around-times vs. modality, patient status, or times of the week. We found this approach increases physician accountability and buy-in to the overall improvement effort.”

Nabile Safdar, M.D.
Associate Professor of Radiology
Children’s National Medical Center
The Importance of Radiology Practice Analytics

Drawing conclusions from reliable data is the key to evidence-based decision-making. Making decisions in the absence of data can be costly and result in a poor return on investment. Here are two examples of questions that drive decision-making, and the data needed to make the appropriate decisions:

**Question:** How are referral patterns changing over time and how does this affect the radiology practice?
**Data Needed:**
- Names of ordering physicians
- Number and type of studies each doctor is ordering
- Clinical indication for the study

**Question:** What opportunities do we have to improve staff productivity?
**Data Needed:**
- Radiologist reading schedule for each day
- Types of studies being read by each radiologist
- Time of day
- Patient demographic data
- Ordering physician patterns

The goal in answering these questions is to quantify every action and decision — at both the practice level and the individual-contributor level, current and historical — that can affect success of the radiology practice. The answers are vital for setting realistic goals and developing tactics to achieve those goals. For example, analytics can help you:

- Improve reporting accuracy
- Enable continuous physician learning, and facilitate accreditation and billing compliance
- Maximize staff productivity
- Maximize satisfaction of referring physicians
- Understand the various factors affecting clinical quality

Radiology practices can gather the necessary information to inform business decisions in one of two ways: by hand or by using search-driven analytics. In very small practices, it may be possible to gather and analyze some data by hand with pencil and paper. But these methods are not ideal, even for the most low-tech practice.

"Manually searching through clinical records to cross-correlate clinical findings is very time consuming and limits the practicality of asking complex clinical quality questions that require correlation of multiple data points," says Terence Matalon, M.D., Chair of Radiology, Einstein Healthcare Network, Philadelphia, PA.

Most radiology practices have adopted clinical information and digital reporting systems to automate data collection. Such systems are storehouses of clinical, financial, and operational data that can be used to inform business decisions. They simplify the tasks of assessing business performance, tracking progress against goals, and pinpointing the attribution of radiology to overall quality of care.

But what data are necessary to collect? Two domains of decision-making dominate the process: clinical quality and business intelligence.

**Clinical Quality.** Clinical quality is the backbone of a successful radiology practice. The metrics necessary for tracking clinical quality include assessments of appropriate imaging, accuracy of clinical reports, comparative data, and trend reports to monitor progress against goals.

"Radiologists are uniquely qualified to lead efforts to increase quality of service, through improved report accuracy, continuous professional learning, enhanced communication with referring physicians and patients, and closed-loop monitoring of critical results," says David Miller, M.D., a radiologist at South Jersey Radiology Associates in Voorhees, NJ. "Tracking and follow-up of biopsy results, whether to support MQSA (Mammography Quality Standards Act) efforts or as part of the clinical routine, can be performed more efficiently when radiology and pathology results can be easily correlated."

**Business Intelligence.** If clinical quality is the backbone of the successful practice, business intelligence is the nerve center. Business intelligence includes such operational data as turn-around time, referral volume, speed of report generation, number of repeat referrals, and impact on productivity, among many other benchmarks. To stand apart, a practice must make evidence-based decisions in order to maintain high-quality customer service and clinical quality at the same time.
**Research and Education.** Decision-making about research and education is highly relevant to academic practices. Academic institutions can strengthen radiology teaching and research programs by rapidly identifying the size of potential research populations and retrospectively reviewing existing clinical research data. This technique is particularly helpful to facilities that do not create prospective disease registries to support clinical research. Radiologists can also save time preparing for clinical presentations because appropriate cases can be identified easily by using natural language searches of report text, rather than searching unwieldy diagnosis codes, medical record numbers, or accession numbers.

“Clinical staff embraced the ability to perform their own queries with a search-driven analytics system that enables rapid identification and assessment of viable research ideas and eliminates conflicts with IT resources and priorities,” said Dr. Matalon. “Using a search-driven analytics program significantly reduces the time needed to identify valuable educational cases and eliminates anecdotal case collection.”

**Choosing Analytics Software: Reporting Features to Consider**

Practice leaders should consider a few key characteristics of analytics reporting when assessing the available solutions for data-gathering:

- Ability to measure operational and clinical quality metrics that help achieve business goals
- Flexibility to present trends and capture detail about the data
- Capability to interact with the initial results
- Ability to cross-tabulate any variable with independent variables
- Ability to analyze structured (discrete) and unstructured (free-form) clinical information
- Ease of use
- Data displays that enable drill-down when an issue is identified

With these capabilities, you first can analyze existing, baseline conditions. Then you can set specific goals and, down the road, compare the baseline to the conditions at any given time. An optimal system can report and graph historical trends and summaries within each of the above capabilities.

Using these more capable analytic tools, you will quickly find answers to such questions as: How many MRI studies demonstrating a tumor had pathology correlation, and how well does the pathology correlate to radiologic findings? And how does this vary by reporting radiologist?
The Case for Search-Driven Analytics

Two over-arching advantages of a search-driven system are:

1. Free Search — You are not limited to canned, pre-set categories of data analysis. By using natural-language search, much the same as an Internet search, you are able to access all data without limitation.

2. Unstructured Capture — You can corral information from the unstructured, free-text radiologists’ reports. A search-driven system will create structure out of open-ended, unstructured information; thereby unlocking valuable clinical data that otherwise would be inaccessible.

In practical terms, these advantages will allow you to:

- Devise complex, multi-part queries and obtain rapid results.
- Obtain a detailed understanding of operational and clinical-quality performance.
- Simplify the correlation of radiology and pathology clinical findings.
- Create opportunities for ongoing physician learning.
- Produce the reports that are optimal for your own practice and that will create actionable information.

Several radiology thought-leaders who are early adopters of search-driven analytics describe their experiences:

“Children’s National Medical Center empowers its radiologists to understand their own turn-around-times vs. modality, patient status, or times of the week. We found this approach increases physician accountability and buy-in to the overall improvement effort.”
- Nabile Safdar, M.D., Associate Professor of Radiology, Children’s National Medical Center, Washington, DC

“Staff was empowered by their adoption of a search-driven system to perform their own queries, because it speeds information gathering and eliminated reliance on IT resources. Questions can be refined more quickly, by simplifying the iterative process.”
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“An automated or semi-automated search-driven approach can help us to re-engineer radiologic follow-up associated with our follow-up recommendations and has the potential to provide tremendous added value from a clinical quality and safety perspective.”
- Eliot Siegel, M.D., Chief of Radiology and Nuclear Medicine, Baltimore VA Medical Center

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Three Steps for Harnessing the Power of a Search-Driven Analytics Program

Step 1 – Select a Variety of Metrics and Cross-Tabs
The first step in any search-driven analytics program is to establish what is happening in your practice. Radiology analytics are not one-size-fits-all. No single set of metrics is appropriate for all scenarios. For example, a practice considering a merger might want to gain a clear picture of referral patterns and growth over the previous five years. A healthy mid-sized practice affiliated with a community hospital might focus on the quality of service provided to referring physicians. Because the appropriate metrics depend on business conditions, it is vitally important that practices select a radiology analytics tool that is both flexible and comprehensive.

It is helpful to chart data from different functional areas and cross-tabulate them against key independent variables. Here are the parameters for several sample charts:

- Study volume — by practice, modality, referring physician
- Turn-around-time — by modality, site, radiologist, referring physician, day of week
- Utilization rate — by modality, date, location, reporting provider
- Clinical report errors affecting insurance claims and reimbursement
- Communication and closure of critical test results — by clinical condition or referring physician
- Clinical report inconsistencies and mismatches — by physician, radiologic finding, time of day

For each hypothetical data set above, the variation by time of day, modality, or site provides a more granular analysis, which, in turn, opens the opportunity for more specific, measurable, and impactful changes.

Step 2 – Capitalize on Unstructured Information
Searching unstructured data helps localize problems and opportunities in a radiology practice. You can capture the data in radiologists’ reports by asking a natural-language question, much like you would when using an Internet search engine.

Analyze unstructured information to:

- Correlate pathology results and radiology findings
- Cross-tabulate desired variables such as turn-around-time and relative value units (RVU) with independent variables such as physician, follow-up, and referral source.
- Understand the rate and type of clinical report errors affecting billing and reimbursement.
- Improve closure of critical test results communication to referring physicians.

Step 3 – Interact with the Results
Interacting with the results helps to pinpoint the root cause of the uncovered trends. When your results are returned on the screen, don’t simply read them — interact with them. Click on a bar graph to see additional information that drives that result. Or click on a number in a table to get a more detailed table that explains that number.

Dr. David Miller of South Jersey Radiology Associates points out, “The ability to interactively drill into a dashboard helps understand what specific questions should be asked and can clarify whether an issue is real or not. The ability to save complex queries can save valuable time in the future and even enable the transcriptionist to monitor radiologist output.”
Reaping Value: A Clear Return on Investment

Tools for business intelligence and clinical-quality analytics will pay for themselves quickly.

- The system provides information that, when acted upon, enhances your revenue and controls costs, thereby providing a quantifiable return on investment.
- The results enable you to reallocate IT resources away from inefficient semi-automated data collection and toward other critical projects.
- The savings are amplified when costly radiologist resources are freed up by automating time-consuming manual tasks.
- Working smarter and more efficiently improves referral patterns and delivers higher quality clinical service, which are well known to increase revenue.

Three opinion-leaders weigh in on why these opportunities are meaningful:

"We knew we were leaving money on the table when we looked at our current referral patterns. Our search-driven system is helping us better understand potential new markets we can access to drive growth of our business."
- David Miller, M.D, South Jersey Radiology Associates, Voorhees, NJ

"Having a search-driven analytics tool not only eliminated a significant amount of time spent running database reports, but also eliminated the time consuming need to search by diagnosis codes."
- Nabile Safdar, M.D., Associate Professor of Radiology, Children’s National Medical Center, Washington, DC

"The Baltimore VA is looking to increase radiologist productivity by automating aspects of report recommendation follow-up. Search-driven analytics speed the identification, and improve the accuracy of studies requiring follow-up; saving time and benefiting quality of care."
- Eliot Siegel, M.D.
  Chief of Radiology and Nuclear Medicine
  Baltimore VA Medical Center

Whether your radiology practice is struggling and distracted by financial concerns, or thriving and busy, it will benefit from the specific and actionable insights of a search-driven analytics program. To maximize the odds of success, begin by involving physicians, technologists, administrative staff, and IT staff in the system selection and training process.

Just as RIS and PACS became required tools for the radiology practice, radiology business intelligence and clinical-quality analytics — particularly those that are search-driven — are the most recent addition to the armamentarium for growing and maintaining your successful radiology practice.

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