Vizient

TechWatch

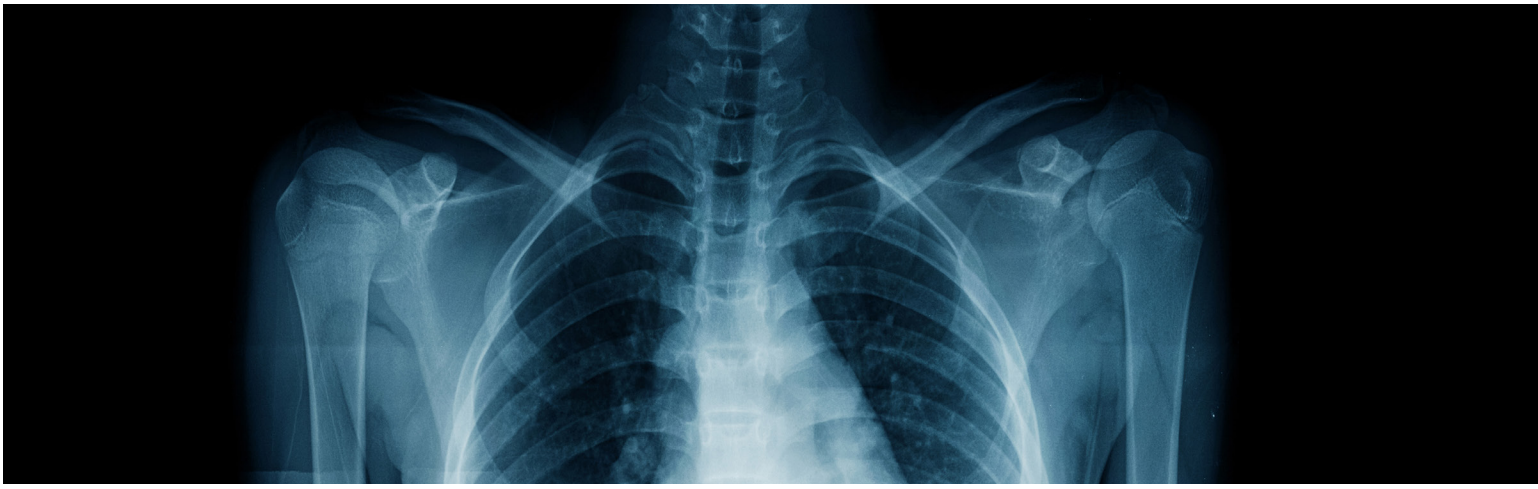
Diagnostic Imaging | Volume 2, 2020

Radiology costing and consumerism

Patient satisfaction through COVID-19

Innovative supplier technology

The *Vizient® Diagnostic Imaging Tech Watch* provides insights and information about new and innovative technologies that support the delivery of high-quality care. This issue highlights imaging trends identified during the Radiological Society of North America 2019 annual conference, as well as regulations that are affecting imaging practices and equipment, and the latest products available from our suppliers. It also features pricing projections for both products and pharmaceuticals applicable to imaging. Our publication brings together subject matter experts from the imaging industry, with contributions from imaging manufacturers, our national contracting team and Sg2®, a Vizient company.



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Economic watch

Price projections affecting the diagnostic imaging market

Vizient market researchers expect overall market prices for supplies to increase 2.1% in 2021. Table 1 shows projected supply chain price inflation over the next 18 to 24 months. Further, table 2 summarizes projected drug price inflation.

Table 1. National price inflation projections, January 2021-December 2021[a]

Product category	National price inflation projection (%)	Product category	National price inflation projection (%)
Cardiology (overall)	0.8	Medical gases	3.7
Cardiac rhythm management	0.4	Purchased services	1.9
Orthopedic (overall)	-0.5	IT hardware	-3.0
Orthopedic supplies	-0.3	IT software	-1.3
Joint implant	-1.2	IT services	1.8
Spinal	-0.2	Commercial printing	1.9
Trauma	0.5	Office supplies	2.3
Neurosurgical	1.5	Furniture	2.9
Electrophysiology	1.9	Construction	3.1
I.V. solutions	5.0	Water	4.1
Medical supplies	2.0	Electricity	2.9
Surgical supplies	1.3	Natural gas	2.0
Medical equipment	0.8	Telephone, wireless	-2.7
Imaging equipment	0.2	Internet	1.2
Laboratory equipment	0.3	Food overall	3.5
Laboratory consumables	1.1	**Overall projected price change**	**2.1**

[a] The June 2020 report projections are for the subsequent 18 to 24 months and are calculated using historical pricing trends, raw material trends, internal resources, the producer price index, the consumer price index and The Financial Forecast Center.
Source: Vizient Budget Impact Projections Report, June 2020.
Abbreviations: IT = information technology, I.V. = intravenous.

As a reminder: COVID-19 presents the most unique market variables and possibly the greatest effects ever on the health care industry. Estimates and forecasts should be used with a greater level of caution than in the past. The volatility in the markets and the large number of unknowns currently make forecasting exceedingly difficult. Markets can change abruptly with a drastic rise or fall, daily or weekly. We suggest a conservative approach when using this data and err on the side of caution.

Table 2. Summary of projected drug price inflation, January 2021- December 2021[a]

Product group	Estimated price change weighted by Vizient purchases (%)
Contract purchases	0.67
Noncontract purchases	2.62
Total weighted average drug price inflation estimate	**3.29**

Source: Vizient Drug Price Forecast, Summer 2020

Market watch

The road to payment reform: a guide for advanced imaging compliance with Protecting Access to Medicare Act

Overuse of advanced imaging modalities has been scrutinized by policymakers as a factor contributing to unsustainable levels of health care spending in our nation. That scrutiny was a driving force behind the passage of the Protecting Access to Medicare Act of 2014 (PAMA).[1] This federal law includes a Centers for Medicare & Medicaid Services (CMS) mandate that ordering physicians consult appropriate use criteria (AUC)[2] using a qualified clinical decision support mechanism (CDSM)[3] when ordering advanced imaging procedures such as CT scan, MRI, nuclear medicine and PET-CT scan.

Following a one-year education and testing period during 2020, the punitive measures of PAMA were expected to take full effect on Jan. 1, 2021. However, recently this year on Aug. 12, CMS announced that it is extending the educational and testing period by one year through 2021.[2] It is not clear if this extension is related to COVID-19 considerations — however, that could be a contributing factor in the CMS extension decision.

Despite this extension, providers should not delay implementing a compliant CDSM system in time for it to be operational before the date punitive measures take effect.

For most health systems, the road to organizational compliance with this mandate, and the effect it will have on their reimbursement, is still unknown. In fact, one radiologist shared with the Vizient imaging contracting team that the ambiguity makes her feel like Dorothy in "The Wizard of Oz," wandering down the yellow brick road looking for the Emerald City. The analogy is worth a chuckle, as well as noting that what helped Dorothy on her journey was having the right friends. For diagnostic imaging administrators, this means that to meet the compliance deadline and avoid reimbursement penalties, they will need to lock arms with others to gather support (the Tin Man's heart), build a system (the Scarecrow's brain) and maintain compliance (the Lion's courage).

Gather support for the change

Gathering support begins with engaging physicians. Since they will be interacting with the CDSM, ordering physicians and their staff will need support for using CDSM tools, along with a reliable point of contact for questions when ordering advanced imaging procedures for Medicare beneficiaries. Current CDSM platforms do not provide a hard stop to providers who order an inappropriate exam, but CMS is actively tracking the national provider identifier of physicians who consistently force orders that are contrary to AUC via Medicare claims data.[4] If you're wondering which referring physicians to focus your outreach on, CMS provides a list of priority clinical areas where CDSMs will focus the most.[5]

Many times, exams that are forced through the mechanism can reveal opportunities for consultation with ordering physicians, preferably by a radiologist peer, toward a more appropriate exam for their clinical question. With radiologist oversight, exam protocols can be standardized across modalities and matched up with AUC to streamline CDSM usage and guide enforcement later. It also helps to have a radiologist leader who will champion the initiative from its inception, ensure practices match up with policy, and serve as a point of contact for referring physicians.

Collaborative relationships between ordering and service providers can enhance usage of the CDSM, increase the number of appropriate exams and mitigate future conflicts.[6] Once the physicians are on board — on the road to the Emerald City so to speak — you are ready to build the system.

Build a CDSM system

If you're wondering what was going on between the passage of PAMA in 2014 and the rollout date of 2021, the gap in time was to allow for provider-led entities to approve AUCs and provide them to CDSM platforms for use. Once the AUCs were in place, CMS began qualifying CDSM platforms that could be used alone or integrated into electronic medical records. There are currently a variety of platforms to choose from and several important things to consider when choosing a vendor.

Start by contacting a CMS-qualified CDSM vendor to investigate options before divisional budgets are due.

The cost of adding a CDSM platform is certainly justified considering the financial penalties of not using one. Be sure to keep physician leaders engaged during this phase as well. Aim for intuitive workflows that increase communication between ordering teams and hospital physicians during order placement.

Currently, Medicalis is the only Vizient contracted CDSM solution and is available on the Siemens clinical informatics agreement.

Also, don't neglect to consider those physicians who are still adamant about faxing handwritten orders — the rules and penalties still apply. Nonemergent orders from the emergency department will also require a proactive approach to avoid conflict. Providing ordering physicians with access to approved protocols and published provider-led entity AUCs can reduce the tendency to force exams through the CDSM system.

As a CMS-qualified CDSM vendor since November 2017, Medicalis offers a total solution for PAMA-AUC compliance from ordering provider to the radiology department.[7] Currently, Medicalis is the only Vizient contracted CDSM solution and is available on the Siemens clinical informatics agreement. To help get you started down the road to compliance, refer to the resources list and view the informative webinar hosted by Siemens Healthineers.

> Despite the extension, providers should not delay implementing a compliant CDSM system to be operational before the date punitive measures take effect.

Establish a process to ensure compliance

Enforcing an effective CDSM should not be a reactionary process. Imaging orders should also be reviewed well in advance of the patient arriving at the clinic and staff should be trained to proactively identify and manage inappropriate orders.

Designate a CDSM team that consists of an imaging staff member or manager, a radiologist, a scheduler and a billing and coding representative. This team should be responsible for receiving, reviewing and managing imaging referrals to completion.

Also, don't forget about the patient! The last thing you want is a patient learning their exam was not payer-approved **after** they arrive for an appointment. Being proactive and contacting patients ahead of time is crucial.

Once the process is in place, track the effectiveness of the CDSM team to identify and engage physicians who are outliers and are risks for creating reimbursement penalties and denials.

The point here is don't wait for the tornado to sweep the house from Kansas. While it's possible that the CDSM deadline gets extended after the trial period, payment reform will remain the destination. The time is now to get started on CDSM implementation. Maybe the road isn't yellow, and maybe you're not headed to the Emerald City, but the journey is real and you'll need the help of others to be successful. Payment reform in Washington will continue to change the health care landscape before our very eyes, but as Dorothy so eloquently stated, "There's no place like home." So start your work there.

To get started on CDSM implementation, access the following guidelines and provider-led entity resources.

- The Road to Payment Reform: A Guide to PAMA AUC Compliance for Advanced Imaging recorded webinar from Siemens Medicalis
- Society of Nuclear Medicine and Molecular Imaging AUC and Merit-based Incentive Payment System update (2018)
- Society of Nuclear Medicine and Molecular Imaging AUC listings

CMS resources:

- AUC fact sheet
- AUC Program overview and timelines
- Provider-led entities information
- CDSM information
- AUC outreach and education

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Ensuring patient satisfaction of medical imaging in a post-COVID-19 world

Now as various parts of the country re-open, how can health systems re-engage with their patients and demonstrate that returning to a new normal is safe?

As the COVID-19 pandemic spread across the country, health systems saw an immediate impact on their outpatient imaging volumes, especially in advanced imaging modalities like CT scan and MRI. Depending upon local ordering practices, volumes dropped between 75% and 85% starting in April of 2020.[1] And today, although volumes are beginning to increase, they haven't yet returned to their pre-pandemic levels.[2] Patients expressed concern about entering health care facilities, and health systems had to scramble to develop strategies to ensure the safety of patients and staff.

Now as various parts of the country re-open, how can health systems re-engage with their patients and demonstrate that returning to a new normal is safe? How can you ensure that patients who require an imaging study are satisfied with the process? In our conversations with Vizient member organizations, we identified several key factors to drive patient satisfaction of imaging in this time of new normal.

1. **Patient backlog list prioritization:** Maintaining a list of postponed patient studies and prioritizing the scheduling of their examinations is a critical first-step in addressing the backlog. Most organizations began with screening examinations and research studies as their first priority.
2. **Communication, communication, communication:** An ongoing focus on communication of available services and hours of operation to patients and referring physicians is critical to moving the needle on working down the backlog and handling new imaging orders. Make sure your communications include details about patient and staff safety, use of personal protective equipment (PPE), and disinfecting procedures.
3. **Extended hours of operation:** Most organizations have extended hours of operation (such as evenings and/or weekends) at their outpatient centers as a convenience for patients to schedule their examinations at a time that works best for them.
4. **Technology to automate the intake and discharge process:** Successful organizations implemented technologies that allow for "touchless" intake and discharge for their imaging patients. Automated appointment reminder calls, emails and texts help avoid no-shows as much as possible. Automated "check-in apps" enable patient intake forms, including insurance verification, to be completed prior to arrival at the facility. Automated "ready for exam" texts notify patients when to enter the facility for their examination. And automated "discharge" notifications alert the facilities management staff to clean and disinfect the examination room, dressing room and other patient areas.
5. **Separate entrance and exit doors where possible:** Maintaining social distancing is more easily achieved if the patient journey through the facility can be managed by one-way routing through the environment.
6. **Rapid report turnaround:** Providing rapid results reporting ensures satisfaction for both the ordering physician and the patient.

Although the pandemic is an unprecedented crisis, it provides a unique opportunity for us to rethink our health care operations and create radically different care models for the next normal. The COVID-19 crisis has called for a reimagination of places, people and strategies for health care organizations to prepare for the post-pandemic phase. In implementing these steps, organizations learned important lessons of effective, tailored communications, and cross-disciplinary teamwork and innovative solutions.

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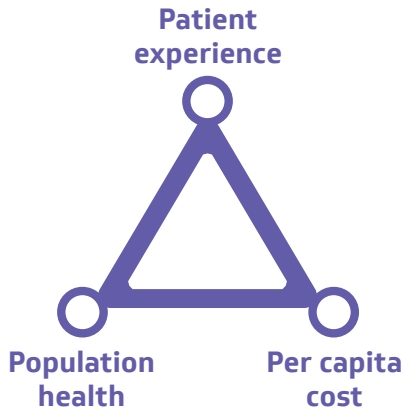
Sg2®, a Vizient company, is the health care industry's premier authority on health care trends, insights and market analytics. Sg2's analytics and expertise help hospitals and health systems achieve sustainable growth and ensure ongoing market relevance through the development of an effective System of CARE.

Revisiting the Institute of Healthcare Improvement Triple Aim Initiative

With the goal of simultaneously improving the health of the population, enhancing the patient experience and outcomes, and reducing per capita cost of care for the benefit of communities, John Whittingtom, MD, and Tom Nolan, PhD, conceived in 2007 the Institute of Healthcare Improvement (IHI) Triple Aim. These principles are increasingly important as U.S. health care spending is expected to hit a record high at 19.4% of the gross domestic product in 2027.[2] This rate of increase is not sustainable over the long term; however, by working together providers and suppliers can slow or even reduce the cost of health care by linking the Triple Aim principles: care, health and cost.



Implementing the Triple Aim has its challenges. However, providers can begin to overcome the speed bumps by detailing their facilities' strengths and weaknesses from the perspective of all major and minor stakeholders. Successful application of the Triple Aim involves addressing the principles at the facility or system level — not just by one department, but applying a broader and more integrated perspective.

Another implementation challenge — and what some cite as a weakness of the Triple Aim — is that the caregiver is not a part of the equation. Many clinical leaders will attest to staff burnout derailing success, especially in achieving the Triple Aim principles. To that end, some hospital leaders incorporate staff by expanding their decision-making and strategy using the "Quadruple Aim." This updated aim includes workplace and staff as a part of the equation. The Quadruple Aim's incorporation of the caregiver, staff and workplace again brings a broader more integrated perspective to implementing and executing the initiative.

Whether triple or quadruple, a factor for success is to apply broad, integrated perspective to your planning. How will you aim to improve care, health and cost?

Some view no incorporation of the caregiver as a barrier to success for the Triple Aim — some with that mindset broaden their perspective and apply the Quadruple Aim to incorporate staff and workplace.

Imaging suppliers solve for the Triple Aim

Here's a few first-hand examples from our suppliers on how they are addressing the Triple Aim.

Improve the patient experience of care (including quality and satisfaction):

- Developing scanners capable of imaging all body types and conditions
- Lowering the radiation dose to the patient
- Increasing image resolution
- Improving processing for faster acquisition-to-results time
- Creating wider bore size
- Applying more patient-centric features such as lighting, audio-video entertainment, etc.

Improve the health of populations:

- Developing artificial intelligence at the modality
- Delivering consistent imaging across all three shifts using technology or services

Reduce the per capita cost of health care:

- Developing platforms for the needs of both acute and nonacute providers
- Offering upgradable platforms
- Creating unique service offerings that will support varying provider needs

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If the price is right: radiology costing and consumerism

In 1973, former President Richard Nixon signed the Health Maintenance Organization (HMO) Act in dire response to the rapidly rising cost of U.S. health care. Less than a year prior to the bill, CBS televised the first episode of the popular game show "The Price Is Right." While HMOs do not exist today in their original format, rest assured that "The Price Is Right" retains its originality even after airing for nearly 50 years.

It is interesting that, despite the national focus on health care spending in our nation, a health care-related product has never made a single appearance on this popular game show. Imagine a contestant making it to the final showcase to guess the price of, let's say, a total hip replacement or an MRI of the abdomen. Is this an absurd notion since the game show is a **consumer** price-guessing game?

Times are changing as the term "consumer" is becoming more common in health care vernacular. With the rise of high-deductible health plans, savvy patients are shopping for health care like never before, and payers are steering patients away from acute hospitals and instead toward less expensive ambulatory clinics. As the health care landscape seems to move closer to a retail-like setting, the growing focus on pricing and cost is likely to intensify.

All data, regardless of cost-allocation method, will be included in CCR calculations starting Jan. 1, 2021

The cost-to-charge ratios dilemma

Because outpatient radiological services are widely considered a shoppable product, outpatient imaging clinics are a prime target of price transparency and the aims of consumerism. Furthermore, the largest consumer of health care in the U.S., the Centers for Medicare & Medicaid Services (CMS), places specific cost pressure on MRI and CT scan services in the recent proposed Hospital Outpatient Prospective Payment System rule. To strategically address this shifting focus on this price-cost relationship, radiology leaders must get actively involved in the cost-accounting process at their organization, work to establish costing methods that create value, and ensure the strategy sticks for the long term.

Ill effects of cost accounting strategies

Over the last six years CMS has required contracted providers to report costing for MRI and CT scan as separate cost centers in order to calculate the cost-to-charge ratios (CCRs), which it uses to determine the claims payment amount related to these services. Unsurprisingly, the costing data reported to CMS for these services was highly varied depending on diverse cost-allocation methods used by providers' financial accounting systems. In particular, a large portion of reporting providers that average their overhead cost across facilities using a square-foot-allocation method severely underestimate the cost of CT and MRI exams.

Intuitively, spreading the cost of a multimillion dollar MRI system across all facilities allows other cost centers to share some of the capital cost burdens and provides a simple top-down accounting method. However, it also removes much of the direct capital cost of the equipment from the imaging cost center.

Exclusions ended Jan. 1, 2020

In recognition of this dilemma, CMS allowed time for providers to transition from the square-foot method to more direct-costing methods by excluding costing data from providers who use the square-foot allocation method. The exclusion of costing data from these providers ended Jan. 1, 2020, with CMS applying 50% of the payment impact (regardless of cost allocation method) for calendar year 2020 and 100% of the payment impact for CCR calculations starting Jan. 1, 2021.[1] Unless providers move to more direct-costing methods for CT and MRI cost centers, CMS reimbursement for these services will likely take another hit on top of already shrinking reimbursement.

It pays to shop around

CMS is not the only group targeting MRI and CT costs. In fact, radiology as a whole has become an easy target for cost-saving and price transparency initiatives from all fronts. Patients, payers and employers realize that it pays to shop around for outpatient imaging procedures by seeking out high-quality, lower-cost imaging clinics. Of course, requiring providers to disclose their negotiated rates for the services they provide makes shopping around easier than ever.[2]

To respond to increasing inquiries, imaging clinics may soon need pricing information available on demand. Imagine a call from a prospective patient asking, "What is the total cost for me to have my scan done at your facility?" How quickly could your facility accurately respond with a competitive price? For most imaging clinics today, this would likely be challenging, if not impossible. As some areas of health care move closer to a retail-style model, those who can quickly respond with accuracy will have an edge over the competition.

Start radiology costing initiatives now

Although it's still likely a long time before consumers see an MRI or CT scan debut on "The Price Is Right", the timing is ripe now for radiology costing initiatives. Given the projected policy changes and the impromptu restart of nonemergent imaging due to COVID-19, it's time for diagnostic imaging leaders to start the conversation with their financial accounting counterparts.

Furthermore, aging imaging equipment and tightening capital budgets are set to ail radiology departments in coming years as quality initiatives pressure radiology operations to show the value of the service line toward patient outcomes. **Radiology leaders should start by asking: "How is cost being measured for our cost center and how is it reported?"**

Keen cost-accounting drives value

Next, cost-accounting systems should be established with the goal of shifting to recommend cost reporting requirements along with optimizing the value chain. While reporting direct cost is an important baseline function, creating value and reducing waste may prove to be more pertinent in the health care arena. Many experts are touting time-driven activity-based costing (TDABC)[3] as a cost-accounting method that can help drive value in the radiology setting. Cost accounting can be complicated and methods like TDABC require additional recording that is beyond traditional accounting.

Time-driven activity-based costing (TDABC): a cost-accounting method that can help drive value in the radiology setting

To avoid abandoning the mission before the benefits come to fruition, it is crucial that radiology leaders are highly engaged and allocate appropriate resources to achieve long-term results. This process begins with acquiring and leveraging financial accounting or enterprise resource planning software systems and ensuring that administrative leaders and support staff are aligned and committed to long-term efforts.

The benefits of measuring and optimizing radiology costs may not be apparent overnight, but those providers who are early adopters of cost accounting strategies could enjoy an early-mover advantage over competitors in their region.

Regardless, critically examining costing methods in radiology could help mitigate looming reimbursement cuts for radiology services and help promote the value of radiology services in the continuum of care. And who knows? Keen costing methods may one day help radiology leaders advance to the final showcase on "The Price Is Right."

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Technology watch

Industry themes from the Radiological Society of North America 2019 conference

December 2019 marked the 105th annual meeting of the Radiological Society of North America (RSNA), and the Vizient diagnostic imaging contracting team was able to attend. They had an opportunity to visit supplier exhibits and see the vast technological innovations on display with our contracted suppliers. The team agrees that the meeting title, "See Possibilities Together," is an accurate overarching description of four themes at the event.

Artificial intelligence (AI) was a hot topic at the show and a prevalent theme. Nearly every manufacturer the team visited is incorporating some level of AI into their systems. Whether they are building their own algorithms or partnering with a third party, they are integrating AI into their solutions. Artificial intelligence can assist technologists by identifying an area of interest in an image and flagging it for immediate read by a radiologist. It can improve image analysis, aid in disease detection and diagnosis, and reduce turnaround time. It's evident that AI will continue to be a leading theme in the radiology field.

Another theme from RSNA 2019 was a focus on the patient experience. Developments by manufacturers bring equipment and accessories to market that aid in creating a comfortable environment for the patient. New MRI features are a few examples of developments that support a positive patient experience, such as lighter weight coils, audio and visual entertainment players and noise reduction capabilities. The benefits of these examples include lowering patient anxiety, reducing patient movement during a scan and improving patient comfort and satisfaction.

Also a prominent theme at the event was analytics. Manufacturers offer sophisticated software developments for a variety of applications in imaging centers for tracking workflow and efficiencies. Some of these include patient scheduling and appointment reminders, patient throughput and efficiency, staff productivity, turnaround times, quality measurement, number of scans and repeat scan percentages. Numerous suppliers offer productivity dashboards that allow users to easily see where they excel and areas that need improvement, both at the individual level and departmental level.

Industry themes most evident among manufacturers during RSNA 2019: artificial intelligence, improving patient experience, analytics and robotics

Robotics was also a theme during RSNA 2019. Enabled by deep-learning and AI applications, many suppliers showcased robotic enhanced equipment. From auto-adjusting patient tables to fully robotic vascular access systems, these robotic enhancements promise to improve workflow and patient outcomes. As suppliers are purchasing or continuing their development of robotic enhanced products, this trend is likely to continue into the years ahead.

At RSNA our team was able to see the possibilities together in AI, patient experience enhancements, analytics and robotics. You can learn about more possibilities in the supplier watch section of this issue.

Four technology innovations shaping the future of diagnostic imaging

The overall health care industry is striving to be more effective. In medical imaging, this translates to improving diagnoses while keeping patient dose as low as possible. Let's explore four significant technology innovations that are helping make that happen.[1]

1. Faster acquisition enables improved image quality

An ever-present goal of digital radiology is to acquire the most information possible. The capability for faster acquisition is enabling many advanced imaging applications and extending the function of traditional radiology systems.[1]

> In medical imaging, making health care more effective means improving information for diagnoses while keeping patient dose as low as possible.[1]

For example, digital tomosynthesis and dual energy provide radiologists with more information for diagnosis. Both improve the visualization of overlying and underlying patient anatomy and provide enhanced detection of subtleties that can be difficult to visualize in traditional two-dimensional radiographs.[1]

Digital tomosynthesis software acquires a series of individual images from a range of different angles that are analyzed to provide depth information regarding patient anatomy. By separating overlying structures, it provides enhanced detection of subtle features.[1]

"We lose a lot of information when anatomy and pathology are overlaid," explains Narinder Paul, MD, of Western University. "Digital tomosynthesis allows us to slice away the overlying pathology to reveal underlying diseases. This is beneficial in cases where the underlying pathology might be masked by the overlying anatomy, like the lung."[1]

Dual energy technology switches between high- and low-energy exposures, using differential filtration to capture and produce two images in succession: a soft-tissue-only image and a bone-only image. Of note however is that the dose using this process is the same as a standard chest X-ray, but gives radiologists the added ability to remove or emphasize structures. For example, a radiologist can emphasize bone to confirm fractures that might otherwise be missed. Conversely, removing bone from the image allows for better assessment of underlying anatomy.[1]

Another innovation for improved chest X-ray image capture is smart grid software. The image capture software reduces the damaging effects of scatter radiation in an image, which helps to improve the contrast of the image when a physical anti-scatter grid is absent.[1] A clinical study evaluating paired grid and nongrid portable chest images at the University of Rochester Medical Center found that the smart grid processing had significantly higher preference overall compared to images without the enhancement.[2]

These other image processing advancements are in the works to help improve diagnoses through faster acquisition:[1]

- Enhanced visualization processing (EVP) and EVP plus
- Tube and line visualization
- Bone suppression
- Long-length imaging
- Pneumothorax visualization
- Pediatric capabilities

Artificial intelligence is getting easier to use, less expensive to deploy, and at the same time more useful.

Expect detector specifications to continue keeping pace with advanced image processing applications. For example, a recently developed detector delivers enhanced resolution to capture the fine detail of smaller anatomical structures in pediatric patients.[1]

2. Gains in optimal dose efficiency

Achieving optimal dose efficiency is patient-centric care and helps providers improve patient satisfaction. The great news about the acquisition improvements discussed is that they are also dose efficient.

> Exposure doses dropped by **15%** to **20%** among U.S. patients between 2006 and 2016[2]

Dual energy solutions not only deliver much more diagnostic information, but also do so at a dose equivalent to that of a single chest X-ray. For these reasons, dual energy solutions have potential to become the new standard of care in chest imaging.[1]

Further, a digital tomosynthesis exam has less dose than a diagnostic CT exam and delivers enhanced detection of subtle features. Also, smart grid software offers dose-efficiency and reduces the damaging effects of scatter radiation in an image.[1]

For orthopedic applications, new systems already exist with the radiation dose at one-third that of a traditional CT scan. “Depending on the patient, one CT image from such a system might save the patient from receiving multiple nondefinitive X-rays,” explains Anish R. Kadakia, MD, professor of orthopedic surgery, Northwestern University and practicing physician at Northwestern Memorial Hospital.[1]

In addition to technology advancements, radiology-led initiatives will continue to curb patient exposure to radiation. A 2019 report shows patient exposure doses dropped by 15% to 20% among U.S. patients between 2006 and 2016. The report credits the drop in dose to radiology-led initiatives such as the Image Gently and Image Wisely campaigns, along with an increased utilization of the American College of Radiology Dose Index Registry and mandatory imaging center accreditation requirements.[3]

3. Two-dimensional image capture evolving to 3D

For decades, two-dimensional X-ray has been the backbone of diagnostic imaging. But is 3D the future of medical imaging?[1]

A long-standing medical imaging administrator states that today, two-dimensional X-ray has limitations. He describes the limitations as imposing a 3D structure on a two-dimensional plate.[1]

Advanced imaging applications are already in use to overcome these limitations. For example, digital tomosynthesis software is bringing 3D imaging capability to digital radiology rooms.[1]

3D imaging is gaining hold in the orthopedic market and will expand that hold in other specialties. At a Midwest imaging center, Brendan Adler, MD, believes 3D imaging applications will continue to evolve. "There is a trend generally in radiology that two-dimensional imaging will be quite a useful management tool. But basically the diagnostic test will be a 3D body metric test — and that goes beyond orthopedics."[1]

CT and MRI scanners also are evolving to produce clearer 3D images with extremely high resolution, less noise and at lower dose. 3D visualization, such as cinematic rendering, creates photorealistic images of the anatomy to help with surgery planning and interpretation of whether a tumor is cancerous.[1]

Additionally, breast tomosynthesis is now the standard of care for mammography screening; while 3D ultrasound ensures that the sonographer captures the entire anatomy with the scan.[1]

> A thousand-fold increase in networking speed — from 10 megabits per second to 10 gigabits per second — enables clinicians to work with much larger data sets, and download and move them.[4]

Many of these advancements in 3D medical imaging are made possible by the computational power that is now available at a relatively low cost, as well as the tremendous increase in networking speed that allows transmission of large data sets in 3D images.[1]

Networking speed has experienced a thousand-fold increase, from 10 megabits per second to 10 gigabits per second, according to Gordon Harris, director of the 3D imaging service at Massachusetts General Hospital's department of radiology. Harris said, "This increase in networking speed enables us to work with much larger data sets, and to be able to download and move them."[4]

4. AI as a supplemental lens for medical image analysis

Artificial intelligence (AI) has dominated session tracks and titles at imaging conferences and industry headlines for several years and continues today.

One Vizient supplier, Carestream, notes that AI is getting easier to use, less expensive to deploy, and at the same time more useful. Data scientists are working on improving: the consistency of radiographic image quality, patient dose, imaging workflow, ease of use and diagnostic assistance. And, the entire process of image acquisition, screening, diagnostics and reporting will continue to become more accessible.

The use of AI and the move to 3D imaging complement each other as there is a tremendous amount of information in the images that computers can analyze and present to the radiologist or referring physician.[1]

Experts believe that no matter how far we look in the future, we will never see a time to replace radiologists. Rather, innovation will better inform clinicians' decisions with more sophisticated image visualization and analysis tools.

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Benefits of contrast-enhanced spectral mammography versus contrast-enhanced MRI

In 2020, among U.S. females alone, there will be an estimated 276,480 new cases of invasive breast cancer. There will be an additional 48,530 new cases of noninvasive (in situ) breast cancer diagnosed.[1] Each one of these cases will undergo a vast amount of testing including diagnostic imaging. Some of these tests include ultrasound, CT scan, MRI and mammography. Today contrast-enhanced spectral mammography (CESM) is another testing option and there are many reasons that it is becoming a more widely recognized and applied way of characterizing lesions in patients with abnormal screening exams: it's accuracy in identifying lesions, the reduced cost, and lower amount of patient time to complete in comparison to other modalities.

Let's look closer. Approved by the Food and Drug Administration in 2011, contrast-enhanced mammography is gaining positive momentum for a variety of reasons. Some factors include the ability to see pathology in patients with dense breast tissue, patients that are contraindicated breast MRI, and the affordability and swiftness of the exam in comparison to a contrast-enhanced MRI scan. Research shows that CESM depicted malignancies in 90.5% of patients with a specificity of 76.1%.[2] The sensitivity rate of a breast MRI exam is 99% with a range of specificity between 37%-97%.[3] This statistic alone makes the CESM modality a valuable tool for patients with a higher risk of breast cancer.

Limitations of MRI

Once a suspicious finding is detected on a screening mammography or ultrasound exam, patients are often sent for further evaluation, which may include a breast MRI. However, an MRI may immediately be ruled out because there are a variety of reasons a patient cannot undergo this type of diagnostic exam, including: the patient is renal compromised, severely claustrophobic, or has a pacemaker, defibrillator, poor venous access, tissue expanders with a metal port or a foreign body such as a metallic fragment in a critical area of the body.

There are other MRI limitations compared to CESM. MRI of the breast with contrast is done with a very precise timing bolus, which means that once technologists start injecting the contrast they have only seconds to start capturing the images. If anything goes wrong during this phase, the exam may be deemed undiagnostic and the patient has to return on a subsequent day to acquire the contrast images. In the case of CESM, the technologist has up to 10 minutes to acquire the images. This allows plenty of time to ensure there is no motion on the images, that all the area of concern is captured and that there is good contrast enhancement throughout the tissues.

CESM advantages

Another reason CESM is gaining popularity is that insurance payer approvals typically do not take as long as they do for an MRI. Due to an MRI costing considerably more in comparison to a routine mammogram or an ultrasound, many insurance companies will require patients to complete multiple tests before they will approve payment of an MRI exam.

The cost for a CESM is simply the cost of a mammogram plus the contrast charge. Comparably, the cost of a screening MRI is approximately four times that of CESM.[5] The lower cost combined with the accuracy and ease of the exam makes CESM a more desirable option for patients and payers.

Lastly, with the many appointments a patient must endure for a cancer work-up, the less time they spend in outpatient or physician offices the better. A contrast-enhanced mammography scan time is about 10 minutes, versus an MRI at approximately a 40-minute scan time. Therefore, patients would spend a fraction of time completing a CESM as they would to complete an MRI. (Note: these timeframes do not account for time to have the patient change, conduct patient screening or to start an I.V.)

Scan-time in minutes	Depicted malignancy rates[4]
10 CESM	**90.5%** CESM
40 Contrast-enhanced MRI	**99%** MRI
	87% Mammography

In summary, CESM offers many benefits similar to MRI, plus advantages, and is an excellent next step and valuable diagnostic imaging tool to identify lesions in patients with suspected pathology and support the diagnoses process following a screening mammography.

CESM advantages over MRI:

- Lower cost means less out-of-pocket for patients and quicker insurance approval
- Less time to complete CESM helps reduce stress and allows patients more flexibility in their schedules
- Longer contrast-to-image-capture time producing less patient motion results in less image clipping and far higher completion rate, as well as lower patient repeat rates

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Pharmacy watch

2020 radiopharmaceutical landscape

Various areas in the medical world are experiencing many changes this year and the radiopharmaceutical industry is no exception. Even prior to the pandemic, there was a lot of focus on safety and sterility of compounded radiopharmaceutical doses. Historically, there have not been unique guidelines specific to radiopharmaceuticals and they have been excluded from some general chapters of the United States Pharmacopeia (USP). To address this void, USP General Chapter <825> was designed and written to provide guidance specific to the compounding of radiopharmaceuticals. Additionally, there is major focus on the emerging theranostic therapies with various new isotopes under study.

USP General Chapter <825>

Due to the unique nature of the compounding of radiopharmaceuticals, there is a need for dedicated guidelines to ensure safety and sterility of these doses. To protect patients, a group of industry experts was convened to write new guidelines and draft USP General Chapter <825>. After allowing the public to comment on their draft and an appeals process heard, a final version was announced June 1, 2020. These new guidelines become effective Dec. 1, 2020.

> USP General Chapter <825> was designed and written to provide guidance specific to the compounding of radiopharmaceuticals

To ensure best practices, compounding pharmacies, hospitals and anyone handling radiopharmaceutical doses are expected to meet or exceed USP <825> guidelines. These guidelines detail expected cleaning practices, sterile compounding techniques and beyond-use dates of the different components. From storage, throughout the compounding process, delivery, and administration to the patient, USP <825> outlines suitable standards to ensure patient safety. These new standards will be used by accreditation agencies — Joint Commission, Det Norske Veritas, state boards of pharmacy and more — in evaluation of pharmacies and nuclear departments moving forward.

Theranostics

Traditionally, a large focus of nuclear medicine has been in diagnostic imaging and emphasis on the physiological function of the targeted organ. A radiopharmaceutical is comprised of a pharmaceutical component and a radioactive component. The pharmaceutical portion has a high affinity for the targeted organ and will rapidly uptake to the targeted organ once injected into the patient. The radioactive component acts as a "tag" and is picked up by the camera to image the physiological function of the targeted organ.

Theranostics is another major topic of conversation in the nuclear medicine community. Theranostics use the same basic concept as diagnostic nuclear medicine, but instead of a diagnostic pharmaceutical tagged by a radioactive component, a therapeutic uses a nuclear isotope. One example in the market would be Advanced Accelerator Application's product Lutathera (Lutetium Lu 177 dotatate), which is used as a therapy for somatostatin receptor-positive gastroenteropancreatic neuroendocrine tumors (GEP-NETs).

In the near future, it is likely we'll see more theranostic agents release into the market as a result of current testing and exploration of various isotopes. Application of theranostics is exciting nuclear medicine news as they provide targeted radiotherapy and may offer patients a new treatment option.

Webinar for more information:

- Managing Radiopharmaceuticals – New USP Chapter <825>

Supplier watch

Agfa Radiology announces DR 100s at RSNA

Also in the news

Prior to the launch of its DR 100s portable, Agfa was awarded in Frost & Sullivan's 2019 Global Multipurpose Digital Radiology Systems New Product Innovation Award for its multipurpose DR 800 system.[1]

At the Radiological Society of North America (RSNA) 2019 annual meeting, Agfa Radiology announced the launch of its DR 100s high-productivity, ergonomic, mobile digital radiography (DR) imaging solution, powered by multiscale image contrast amplification (MUSICA) image processing. With a customer-driven design that meets the needs of today's health care environments, the DR 100s delivers a new force in mobile imaging. It combines excellent DR image quality, fast image access and a broad range of applications, including chest, abdomen, skeletal and long-length stitched exams to improve productivity while supporting enhanced patient care.

Agility is a part of design as the drive motors and compact design enable the DR 100s to offer excellent maneuverability. Its 22.8-inch width and FreeView collapsible telescopic column make it easy for staff to move the unit along narrow, crowded corridors and patient intensive care units.

Thoughtful features such as a conveniently positioned power plug, storage for personal protective equipment, an integrated detector battery charger, optional detector security locks and Bluetooth remote exposure switch add to the efficiency of the design.

On a large 22-inch touchscreen monitor, the workstation can be angled to eliminate glare from overhead lights. It enables comfortable viewing of image previews and access to a broad range of tools, applications and features.

Bedside imaging is comfortable for operators and patients alike. The tube head with ZeroForce technology makes manual movement nearly effortless in three directions. The large 10-inch on-tube display allows bedside adjustments while maintaining close contact with the patient. Plus, the display gives the operator access to patient data, generator settings and image preview.

Feedback from an early radiographer user compliments the maneuverability of the DR 100s, even in a small space. Other favorable user input includes the ability to make subtle movements such as raising the column, turning the system in either direction and using precise positioning with the flexibility of the X-ray tube.

Further, the on-board MUSICA Acquisition Workstation is the same intuitive and flexible user interface used in Agfa DR rooms, with a design to optimize technologist workflow. On a large 22-inch touchscreen monitor, the workstation can be angled to eliminate glare from overhead lights. It enables comfortable viewing of image previews and access to a broad range of tools, applications and features.

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Single-platform CVIS connects to EMR providing immediate data access for better care

Challenge: getting the whole picture from the EMR

Salem Health began searching for a new cardiovascular imaging solution (CVIS) when its existing platform was performing below expectations and was obviously nearing the limits of its capabilities. Faced with large upgrade costs, the executive team instead sought an imaging system that could accommodate the needs of the growing organization. Salem Health, a Vizient member serving Oregon's mid-Willamette Valley, envisioned a future as a one-stop community resource in which the local hospital and its clinician partners were aligned via true, seamless integration.

At the time, the organization used unconnected systems. The catherization (cath) lab used a separate hemodynamic (hemo) monitoring system, with no reporting capability. Procedure reporting was done through either transcription or a limited shortcut in Salem Health's electronic medical record (EMR) system — painstaking and definitely not real-time.

Cardiologists recall that their notes could not be linked to relevant images and could only be added to the progress notes section in the former CVIS. Additionally, there was no ability to tie together hemodynamics and the procedure log with the report.

Overall, viewing a patient case through the EMR only provided an incomplete patchwork of unconnected data assets.

Solution: a single platform offering

Salem Health set out to find a new CVIS that would readily enable clinicians to enter patient and case data with the result of real-time, integrated reports. This meant a system with image access, structured reporting, and seamless integration with their EMRs. After significant review and input from front-line staff, physicians and clinicians , the health system implemented the single-platform cardiology system from Change Healthcare.

"We adopted this platform for invasive and noninvasive services, as it was the most user-friendly and comprehensive system we could find," said Valli Brunken, manager of angiography, electrophysiology and interventional recovery for Salem Hospital. "The platform fully integrates PACS with our documentation while offering comprehensive provider reporting features."

The new CVIS solution was the first choice for both Salem Health's cath lab staff and its imaging informatics team, who support the organization's EMR and picture archiving and communication system (PACS). "Since reports are easily imported as PDF files, the entire care team can immediately view the procedure notes and providers' preliminary reports within our Epic EMR," said Brunken. "Our experience with Change Healthcare has been exceptional. They've partnered with us to create an excellent system."

All the data, all the time

With the Change Healthcare Cardiology system, reports are linked to images through the PACS system, so the care team can retrieve images whenever necessary. The system also links hemodynamics and the procedure log to the report, giving the care team ready access to medications, stent size, and other details. Care team members no longer waste time pulling up past dictation to find case details.

"Having everything in the same system is an extremely important piece of the puzzle, as it makes reporting after the case or alternate provider review much simpler," states Kevin Thompson, DO, a cardiologist at Salem Health.

The Change Healthcare Cardiology system helps ensure accurate data, which in turn improves patient care. "Having our cath procedure data and reports immediately available from the EMR has been a great benefit," said Thompson. "We're getting more accurate data and the entire care team can easily access it."

Each member of the cath lab team can use the solution to document information simultaneously during the procedure. "The cath lab is a team approach and each user has a different role," said Brunken. "When everyone's working on a single platform, the real-time data is accessible for multiple users. Everyone is looking at the same record at the same time, but from their own perspective."

Complete reports with ease

And because the system provides structured reporting, it allows users to query any elements for operational, clinical quality and financial analytics — a powerful time-saving benefit to input and gather data. "The documentation is going into the system as part of the structured report, so staff can go into our Epic EMR, pull up the clinical report and easily see the data," said Brunken. "We can also use the data behind the structured reporting for analytic purposes."

The automation that comes with Change Healthcare Cardiology also provides an easier framework for meeting quality initiatives for National Cardiology Data Registry reporting of interventional data and Joint Commission accreditation requirements.

> "The entire care team can immediately view the procedure notes and the providers' preliminary reports within our Epic EMR. Our experience with Change Healthcare has been exceptional. They've partnered with us to create an excellent system."
>
> *Valli Brunken, MBA BSN RN PMP NE-BC*
> *Manager of Angiography,*
> *Electrophysiology and Interventional*
> *Recovery for Salem Health*

For example, the Salem Health cath lab team does a special huddle for high-risk cases to ensure all technicians and nurses are clear on the procedure. The Change Healthcare system facilitates tracking the accompanying quality improvement metrics for such cases.

For Teri Benzinger, lead angio technologist at Salem Health, the ability to quickly turn over reports and data pulls is impressive. "I've been in the cath lab for more than 14 years. We used to print out all reports and documentation and put it in the paper chart," Benzinger said. "Now, our hemo report fully integrates with Epic EMR, so you can pull up the finalized report — within milliseconds — on the floor and in primary care afterwards. You can see the size and kind of stent used and which medications have already been administered."

The physician's report now captures data ranging from the ultrasound to 3D imaging and intracardiac echocardiogram — a drastic improvement from the previous workflow, where data was stored and retrieved from multiple systems. "You need a cardiology system that's going to provide efficient data recording and documentation, for technologists, nurses, and physician providers, and that's what we have with Change Healthcare," Brunken said. "The documentation is very clear, and it's quicker and easier."

> "We have quicker release of information to the chart, before the patient even leaves the procedure room. Any time we have more availability of data, that translates into improved patient care."
>
> *Kevin Thompson, DO*
> *Cardiologist*
> *Salem Health*

Best of all, when patients return months or even years later, the system autopopulates with their medical history data, providing valuable reports and information to their care team.

Results: across-the-board efficiencies for more accurate care

Salem Health can now ensure that the clinical team is capturing the necessary data, that documentation is accessible in its EMR, and that they capture charges for accurate reimbursement and supply management.

These changes create tangible results. Due to new efficiencies in both the nursing and technologist workflows, the cardiovascular service line increased its capacity. Additionally, Salem Health was able to cut its standard echocardiogram completion time by 15 minutes, and reduced completion time for standard coronary cases by 25 minutes. The addition of readily accessible cardiology data to the health system's EMR is creating savings while improving care. "We've eliminated the delays associated with transcription and reduced those costs," Brunken said.

In fact, not using dictation is saving 12 hours per case. Before a cardiologist even completes a case, the report is now part of the medical record.

From a decision support point of view, readily accessible patient data is invaluable. "A faster turnaround into the charts is important to The Joint Commission, as well as to patient outcomes," Thompson said. "We have quicker release of information to the chart, before the patient even leaves the procedure room. Any time we have more availability of data, that translates into improved patient care."

In its quest for better data, Salem Health is proud to achieve 100% cardiologist adoption of echo and cath structured reporting.

"Cardiologists are looking for straightforward structured reporting, linking of images, remote access, hemodynamics and reporting in one system," explains Thompson. "We've been pleased with the usability and results we've achieved using Change Healthcare Cardiology."

And the entire Salem Health cardiology team is pleased with gaining easy access to the necessary data to create a complete case picture in the EMR.

Key results

- Reduced report turnaround time by 12 hours
- Reduced standard echocardiogram time by 15 minutes and standard coronary cases by 25 minutes
- Achieved 100% cardiologist adoption for echocardiogram and cath structured reporting

All article content is sourced from:
Case study-Salem Health improves accessibility to EMR data. Change Healthcare website. November 12, 2019. Accessed September 1, 2020. https://www.changehealthcare.com/insights/case-study-salem-health

Introducing the world's first glass-free and lightest digital radiology detector in its class

The Fujifilm D-EVO III is the world's first glass-free and lightest digital radiology (DR) detector with patented irradiated side sampling (ISS). The standard 14-inch by 17-inch model weighs just 4 pounds, which is 25% to 40% lighter than prior models.[1]

Eliminating the most fragile portion of the detector — glass elements — significantly reduces the detector weight. The new detector uniquely provides substantially improved durability and weight, without sacrificing image quality.[1]

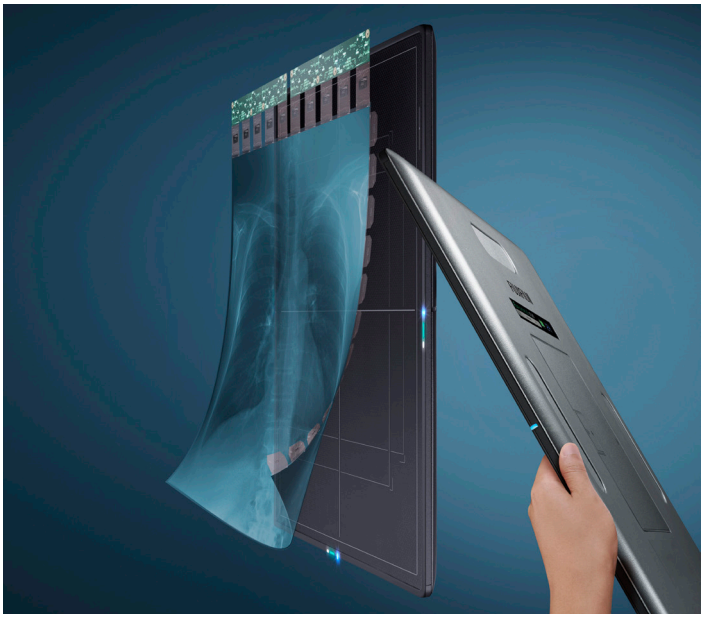
The traditional glass-substrate layer is replaced with Fujifilm's innovative film-based capture circuitry layer. The thin capture design combined with ISS results in reduced signal blur, providing excellent detective quantum efficiency and dose performance.[2]

The detector's housing is constructed of lightweight and rigid magnesium alloy, with an inner frame design that protects its internal components. It can withstand up to 683 pounds of distributed load and 351 pounds of point-load capacities.[2]

The Fujifilm digital radiology (FDR) D-EVO III also retains all of the innovative benefits of its predecessor EVO II, such as ISS and noise reduction circuitry, high-sensitivity capture technologies, smooth tapered edges for easier positioning behind the patient, antibacterial coating to provide added safety measure for infection control, built-in image memory, extended battery life through two automated sleep modes and more.[2]

This lighter weight, glass-free detector:

- Simplifies positioning under the patient for technologists
- Makes the detector less prone to drops
- Avoids glass damage to inside components should the unit get dropped



It is also compatible with same accessories as the D-EVO II series including cable, docking stand, charger and batteries. The D-EVO III serves as an ideal detector for demanding high-volume rooms and portable environments.[1]

The lighter-weight, glass-free detector simplifies positioning under the patient for technologists and is less prone to drops. Further, the glass-free components help avoid damage to inside the unit should it get dropped.[2] These enhancements offer greater return on investment, enhanced dose and image quality, performance and improved staff and patient experiences.

The FDR D-EVO III has Food and Drug Administration approval and launched in markets late spring of this year.

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MRI advancements with SIGNA Works AIR Edition and AIR Coils

SIGNA Works AIR Edition is GE Healthcare's latest software release for SIGNA Artist 1.5T and SIGNA Architect 3.0T magnetic resonance scanners. The software introduces new technologies and improvements for exceptional versatility, productivity and image quality.

AIR includes intelligent workflow applications to automate the scan process to drive consistency. For example, brain exams can benefit from AIR x, a deep-learning algorithm that automatically prescribes slices to help eliminate error-prone, manual-slice placements. It was developed using a database of more than 36,000 images and offers five-times faster set-up and four-times fewer clicks so technologists gain efficiency in exam set up.

Another innovation is AIR Touch, a new workflow application that automates coil selection and landmarking, activates an optimized set of coil elements based on the patient's anatomy and integrates all calibration scans — providing an uninterrupted workflow for the technologist. Further, scan time savings are realized with flexible no phase wrap for scanning only what is needed, while allowing the technologist to focus on the patient, not the scanner.

SIGNA Works AIR Edition also includes AIR Recon, GE's new reconstruction algorithm available on several key applications, including PROPELLER, Cube, Fast Spin Echo and Flex. It can reduce background noise and out of field-of-view artifacts, while improving signal-to-noise ratio. The result is cleaner, crisper images without having to overcompensate in scanning protocols.

Perhaps one of the most exciting innovations now available on SIGNA Artist 1.5T and SIGNA Architect 3.0T MR scanners are AIR Coils. Awarded Best New Radiology Device of 2019 by AuntMinnie, AIR Coils are the foundation of a simply better MRI experience. The engineering breakthrough at the heart of these coils makes GE Healthcare the industry's first to create this lightweight, flexible design, laying the groundwork for greater positioning freedom and a comfortable patient experience.

The shape of the coil no longer limits what the technologist can do with it. Wrap it around a knee for a complete knee image. Move it from the knee to an elbow without a need to move the patient. Drape it over the torso of a patient with high body mass index if needed.

What really sets the GE AIR family of products apart is the way they all work together. By starting with an engineering breakthrough that led to a lightweight coil design, it set the groundwork for intelligent workflow applications and an all-new reconstruction algorithm. Each one builds from the potential of the product family to transform the entire MRI experience.

GE Healthcare SIGNA Works AIR Coils

Recipient of Best New Radiology Device of 2019 awarded by AuntMinnie*

All article content is sourced from:
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Mammography: 3DQuorum imaging technology

A recent product release from Hologic is the 3DQuorum imaging technology that delivers their highest 3D imaging, faster. It is powered by Genius AI, Hologic's breakthrough artificial intelligence (AI)-powered algorithm to expedite mammography exam reading time without compromising image quality, sensitivity or accuracy.[1]

3DQuorum technology uses the power of Genius AI analytics to uniquely reconstruct high-resolution 3D data to produce 6 millimeter SmartSlices. These analytics identify clinically relevant regions of interest and preserve important features during reconstruction of the SmartSlices. Each high-resolution SmartSlice overlaps the previous one by 3 millimeters, ensuring there is no loss of 3D image data or continuity in scrolling.[1]

"AI technology can help improve workflow for radiologists, which can in turn impact patient care. Although it is clinically proven to detect more invasive breast cancers, DBT technology produces a much larger amount of data and larger data files compared to two-dimensional mammography, and this creates workflow challenges for radiologists," said Samir Parikh, global vice president of research and development at Hologic.

"However, AI technology now exists that can help reduce reading time for radiologists by identifying the critical parts of 3D data worth preserving. The technology can then cut down on the number of images to read while maintaining image quality," said Parikh.

SmartSlices expedite read time by reducing the number of images for radiologists to review, without compromising image quality, sensitivity or accuracy.[1]

Overall, using 3DQuorum with its built-in advanced technology reduces the number of 3D images by two-thirds — saving an average of one hour per eight hours of daily image interpretation time.[1]

Reimbursement support: Hologic offers reimbursement and coding support through the Pinnacle Health Group. The Pinnacle Health Group provides live coding and billing information through a staff of professional, certified coders to assist you and address questions regarding insurance coverage, claim appeals or denials, private-payer research of contracted rates, patient benefits verification and patient pre-certification. Hologic also outlines general coding and reimbursement for imaging in its online Breast and Skeletal Health

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SmartCurve: providing a better patient experience and increasing exam compliance

A survey of 10,000 women found that fear of physical discomfort was the top reason for avoiding a mammogram by women who have never had one.[1] With this in mind, Hologic developed a system capable of reducing breast pain without compromising the effectiveness of the exam.

The SmartCurve breast stabilization system replaces the traditional flat paddle with a curved surface that mirrors the shape of a woman's breast. The system reduces the pinching associated with mammograms and allows for better distribution of force. It improved comfort in 93% of women studied who reported moderate to severe discomfort with standard compression.[2]

To achieve the right curve for its SmartCurve, Hologic's research and development team developed a software algorithm to adjust for the curvature of the compression surface. The resultant two-dimensional and 3D images are equivalent to those taken with standard flat paddles and do not impact the radiologist's review.

Facilities can use resources in Hologic's Platinum Marketplace to promote their availability of Genius exams and use of the SmartCurve system to patients and referring providers. The SmartCurve system is standard with Hologic's 3Dimensions system and an option for Selenia Dimensions systems.*

Survey results indicate that 80% of women who delayed their mammogram due to discomfort are less likely to delay future mammograms and that the availability of the SmartCurve system will increase compliance with mammography.[3]

Reimbursement support: Hologic offers reimbursement and coding support through the Pinnacle Health Group. The Pinnacle Health Group provides live coding and billing information through a staff of professional, certified coders to assist you address questions regarding insurance coverage, claim appeals and denials, private-payer research of contracted rates, patient benefits verification and patient pre-certification. Hologic also outlines general coding and reimbursement for imaging in its online Breast and Skeletal Health Coding Guides.[4]

*Minimum software requirements apply.

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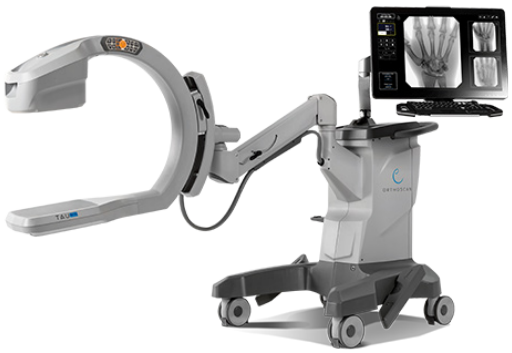
Orthoscan introduces TAU mini C-arms: FDA approved for pediatrics

Orthoscan's fall 2019 release of its TAU family of innovative miniature (mini) C-arms brings technology advancement to the market. The TAU family is the first mini C-arm designed and approved for use on pediatric patients.[1] TAU C-arms use Orthoscan's Intelligent Dose Reduction, a set of features that together, significantly reduce the dose received by a patient while maintaining diagnostic image quality. [2]

The TAU family includes three distinct models: TAU 1512, TAU 1515 and TAU 2020. Features include:

- Three models with different detector sizes (15 centimeter (cm) by 12 cm, 15 cm by 15 cm, and 20 cm by 20 cm)
- Pulsed fluoroscopy for reduced dose (not included on TAU 1512)
- Only mini C-arm cleared by the Food and Drug Administration (FDA) for use on pediatric patients
- 27-inch and 24-inch diagnostic monitor options
- Surgical LED lights to illuminate the field of view
- 160-degree over-rotation for simplified, less-stress patient positioning
- Flat-form detector design

The TAU family is the first mini C-arm designed and approved for use on pediatric patients



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Excel in your daily MR services — **helium-leak free**

Every day, health care moves forward with new clinical pathways, innovations and supporting technologies. In radiology, meeting the need for high productivity and an improved patient experience while ensuring excellence in imaging can be daunting. The perception is often that magnetic resonance (MR) represents a trade-off between productivity and image quality, along with helium-related issues. However, providers can break through that perception with the new Philips Ingenia Ambition that offers cutting-edge MR imaging techniques.

Based on its new, revolutionary fully sealed BlueSeal magnet, the solution lets you experience more productive helium-free MR operations, simplify your MR installation, and reduce lengthy and costly disruptions in your MR services.

Transition your department toward more productive MR operations, free of helium leaks

- Capture a wealth of structural and physiological information in muskuloskeletal – with up to 60% higher resolution
- Shorten breath holds by up to 40% and increase patient compliance in abdominal and cardiac imaging
- Enhance clinical confidence in breast and pelvic imaging – up to 25% higher resolution in the same scan time

With a decade of innovation, the BlueSeal magnet operates with only seven liters of liquid helium and is fully sealed – freeing up your mind and operations from potential helium complications. With BlueSeal magnet, Philips aims to help MR facilities overcome potential helium-related issues resulting from classic magnet design and eliminate radiology departments' dependency on scarce helium supply. What's more, the system can achieve hours of continuous high-performance scanning and offers a leading field-of-view of 55 centimeters for a wide bore 1.5T system.

The Ingenia Ambition delivers superb image quality even for challenging patients and performs MRI exams up to 50% faster with Compressed SENSE acceleration for all anatomies in both two-dimensional and 3D scanning — with virtually equivalent image quality. Fast overall exam-time is achieved by simplifying patient handling at the bore with the touchless guided patient setup. As a result, Ingenia Ambition not only accelerates sequences, but the entire patient exam — enabling facilities to consider adding patient slots to daily schedules. This new paradigm in productivity applies to all anatomies and anatomical contrasts, in both 3D and two-dimensional scans. And overall, staff have more time to focus on what matters most: enhancing patient care.

Additionally, the Ingenia Ambition offers an immersive audio-visual experience to calm patients and guide them through MR exams. In a study conducted using the Philips' in-bore solution, Herlev Gentofte University Hospital in Denmark managed to reduce the number of rescans by up to 70%, allowing radiologists to review more patients per day.

All article content is sourced from:
Excel in your daily MR services. Phillips Ingenia Ambition X product brochure. Accessed August 17, 2020. https://www.philips.com/c-dam/b2bhc/master/landing-pages/ambition/brochure-ingenia-ambition-x.pdf

Connecting image guidance to treatment delivery with Siemens Healthineers

Siemens Healthineers was able to again attend the Radiologic Society of North America (RSNA) 2019 annual meeting with more than one announcement.

As presented at RSNA, the fall 2019 acquisition of Corindus Vascular Robotics allows Siemens Healthineers to enter the narrow field of robotic-assisted intervention, where physicians interact and operate behind a radiation-shielded workstation, or from a remote location, and can position devices and deliver precision treatments to patients.

Historically, during interventional procedures, physicians operated by the tableside and were exposed to secondary radiation during the procedure. In addition, the results of the case were solely dependent upon the single physician entering the room to do the procedure. Robotic-assisted intervention has significant advantages in both areas. First, moving the physician to a shielded operation console or working remotely minimizes their radiation exposure. Second, using robotics has proven to provide more reproducible results. And, with the ability of Siemens' Corindus solution enabling remote intervention, there is potential to access other experienced physicians who may not physically be available on-site.[1]

Siemens Healthineers also introduced at RSNA their next generation interventional suite, the ARTIS icono. The ARTIS icono paired with Siemens' Corindus Vascular Robotics maximizes advanced imaging to enhance minimally invasive procedures by addressing core with next-generation image guidance and unprecedented image quality. Image quality and navigation guidance helps physicians get to procedure targets with precision. The technology optimizes image quality over the targeted anatomy while providing combined applications to reduce exposure and dose.[2]

The ARTIS icono paired with Siemens' Corindus Vascular Robotics maximizes advanced imaging to enhance minimally invasive procedures.

Key features and value of ARTIS icono include[3]

- Connected and digital interventional suite
- Unprecedented image quality making the unseen visible
- Improved patient outcomes with one-stop stroke assessment and therapy
- Personalized case workflows for higher patient throughput
- Increased utilization through enabled multidisciplinary usage three-in-one system

These Siemens Healthineers solutions enable your team to achieve the following three key pillars.

Addressing core with image guidance and navigation

- Enhancing minimally invasive procedures with ARTIS icono
- Reinforcing portfolio and coverage in fast growing geographies
- Leveraging the multimodality services (interventional angiography, CT scan, MRI, vascular robotics), for next-generation therapy guidance

Improving precision and transforming care delivery

- Treating with one-stop angio-based stroke assessment and therapy with ARTIS icono
- Enhancing the interventionalist's eyes and hands with Siemens' Corindus solution
- Improving patient access with remote treatment

Expanding scope and number of procedures

- Expanding addressable market
- Adding per procedure revenue by focusing on cardiovascular and neurovascular procedures where advanced imaging drives better outcomes
- Broadening scope in cancer therapy by providing integrated navigation solutions for ablation and embolization

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SOMATOM X.cite: Siemens Healthineers launches the era of intelligent imaging

As the number and complexity of radiological procedures increases, demands on staff are reaching unsustainable levels and negatively affecting image quality. Too often, the full potential of computerized tomography (CT) scanners remains untapped. SOMATOM X.cite changes that. Together with myExam Companion, it launches the era of intelligent imaging. Now users of any skill level can unlock the system's potential, which can help them achieve reproducible results.[1] From routine to advanced procedures, SOMATOM X.cite empowers excellence in computerized tomography.

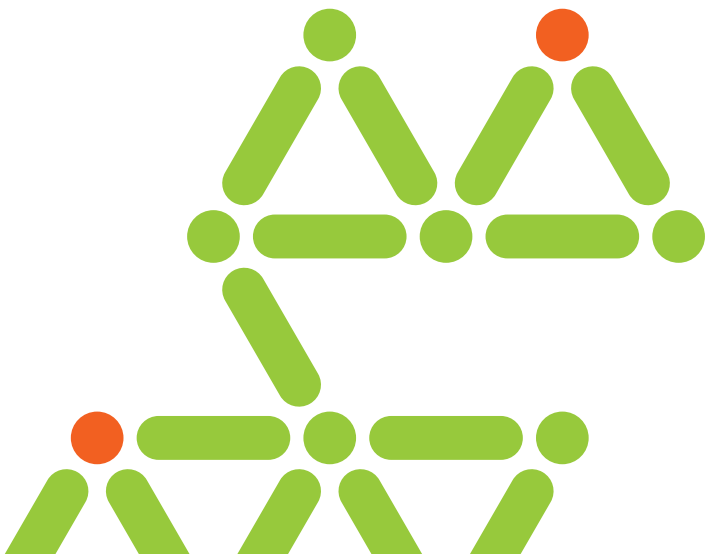
Intelligent navigation for enhanced consistency

Reliable and reproducible results are possible with myExam Companion, which brings a new approach to scanner operation. The unit's design makes work easier for users with the ability to personalize procedures for patients and deliver consistent comprehensive results for radiologists. It guides users of all skill levels through routine examinations as well as more complex procedures like stroke, spectral studies or coronary CT angiography. For example, the unit guides users to measure the patient's heart rate and ask patients the right question at the right time, such as, "Did you drink coffee in the last four hours?" or "Do you have stents?" Additionally, it will even guide with relevant questions for clinicians, such as "Are automatic reconstructions of the coronaries needed?" The answers selected for these simple questions are then linked to predefined scan parameters.[2]

Personalized imaging for comprehensive results

SOMATOM X.cite generates comprehensive information that can help radiologists diagnose with precision and confidence — no matter the patient or procedure. The power stems from its outstanding imaging chain, which includes the Vectron X-ray tube. The user guidance comes from myExam Companion, which tailors acquisition to the individual patient.[2]

SOMATOM X.cite also leverages GO technologies. For example, Check&GO can identify potential errors in organ coverage, contrast media volume and distribution, and can identify the presence of wearable metal objects (e.g., belts or jewelry) — helping users take immediate action or make corrections. By automating many post-processing tasks, Recon&GO reduces the number of workflow steps: the results are automatically sent to a picture archive and communication system, including curved planar reformats for the main vessels, ribs and spine.[3]



SOMATOM X.cite generates comprehensive information that can help radiologists diagnose with precision and confidence — no matter the patient or procedure.

Designed to transform the patient experience in CT scanning

The SOMATOM X.cite features a large 82-centimeter bore, which is ideal for obese patients and trauma, orthopedic or interventional procedures. With an optional FAST 3D camera, the scanner can help set the right dose modulation with FAST Isocenter, choose the correct body region with FAST Range, and set the right scan direction with the FTS Direction feature. An integrated mobile workflow via a removable tablet enables users to stay close to the patient at all times by preparing all scans right at the gantry. An additional, optional gantry-integrated observation camera helps users monitor patients even when inside the gantry. And with a new, gantry-integrated visual patient instruction feature, it may be possible to improve compliance with breath-hold commands by having patients focus on the intuitive, color-coded breath-hold countdown that displays on the front and back of the tunnel.[1]

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Diagnosing and monitoring COVID-19 patients using advanced ultrasound technology

Looking at all the innovations around, have you ever wondered how much of the 21st century technology is truly made accessible to health care providers for improving diagnosis? There is a growing community of doctors, who propose adding insonation alongside inspection, percussion and auscultation to improve the standard of physical exams.[1] The current pandemic crisis has exposed the burden of high patient volume and low or no-point-of-care diagnostic options on clinicians. Further, we can no longer ignore the burnout of physicians[2] and nurses[3] alike. But new solutions cannot get to the front lines using only old tools and training methods. To address this burden, point-of-care veteran and innovator, and former SonoSite CEO, Kevin Goodwin, along with Niko Pagoulatos, PhD, a recognized ultrasound innovator, joined efforts to create EchoNous — an artificial intelligence (AI)-driven, medical device company that aims to make technology, currently reserved for specialists, accessible to all.[4, 5]

The launch of KOSMOS

EchoNous' vision has been to create a diagnostic tool in the hand-held format that is low cost and capable of delivering high clinical value, through the meaningful application of AI. In the first quarter of this year, EchoNous launched KOSMOS, the world's first assessment tool to synchronize high-performance ultrasound, high-fidelity digital auscultation and electrocardiogram (ECG). Inspired from the sum of all things in the universe, KOSMOS explores a new clinical world where the sum of all vital signals from the heart and lungs, enable physicians to deliver critical diagnoses in a matter of minutes.[4]

Following several months of clinical evaluations, KOSMOS is routinely described by physicians as an exciting, new kind of medical tool. Along with the 8-ounce probe, KOSMOS comes with a 23-ounce proprietary tablet called the Kosmos Bridge, which hosts the AI platform. This platform is developed on convolutional neural networks, which are trained on thousands of expert annotated ultrasound clips, with an aim to diffuse and scale expert knowledge to front-line care providers. All the computations run on the Bridge itself, eliminating the need for cloud-connectivity during use, which ensures data security and improves service performance.[4]

Currently the KOSMOS platform can calculate systolic heart function metrics (left ventricular ejection fraction, stroke volume and cardiac output), which has been clinically tested against expert measurements, yielding excellent results in precision and consistency. The transparency of the AI platform is what makes it truly unique in efforts to drive repeatability and reproducibility of the key measurements.[5]

Approval in time for vital need of speedy diagnostics

KOSMOS is particularly suited for diagnosing and treating COVID-19 due to the ability to acquire high quality vital heart and lung information in an unprecedented few minutes. Its hospital-grade materials can withstand harsh cleaning chemicals. Additionally, it's simple to disinfect and its portable and durable design makes transport through busy care units easy.[4]

Bedside assessment of these type of heart and lung variables often requires considerable skill, training and experience with different devices and patients. The KOSMOS AI Trio algorithms, set to launch later this year, were developed to provide users, real-time automated image grading, acquisition guidance and heart labeling.

In other words, the algorithms will grade the user's acquisition quality based on a preestablished point of care ultrasound (POCUS) grading scale, guide them with real-time feedback on probe orientation and label key anatomical structures in their imaging plane. However, a patented, Food and Drug Administration-approved innovation, along with the Trio AI algorithms is just the tip of the iceberg.[4]

User training

The hallmark of any successful innovation is the ease of adoption and use, especially for the novice users. To demonstrate commitment toward education and future generations, EchoNous will also offer an AI-driven, medical education platform later this year. The medical education platform, called KOSMOS UP — with UP being university programs — will automate coaching, reduce manual grading effort and provide reporting, archiving and workflow management of the clinical data. It will enable professors to dedicate more time to teaching and mentoring by automating manual tasks, performance measurements and analytics tracking with its onboard AI. The software is designed to have an intuitive user interface along with digital imaging communications compatibility, flexible storage, encryption and an online hosting solution to drive optimization and scale.[5]

The KOSMOS platform was assessed in several acute care clinical settings on more than 300 patients, while also under continuous evaluation in live clinical settings by hundreds of physicians and imaging experts across the U.S., Canada, Europe and Japan. EchoNous has validated that KOSMOS is indeed the world's first AI-assisted hand-held tool and the first to deliver diagnostic grade ultrasound capability at the bedside, versus current hand-held ultrasound devices that provide a quick look. Furthermore, KOSMOS has been favorably compared to capabilities of large, cart-based machines used in point-of-care medicine.[4]

EchoNous is driving transformational change with a vision that we can live in a world where, with minimal training, any care provider can acquire high quality, vital heart and lung information in an unprecedented few minutes.

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RFD Hybrid System for TAVR offers new, smaller option

In the changing world of health care, facilities are looking ahead to minimize costs to stay competitive, while still providing excellent health care. Ziehm Imaging is in the forefront helping hospitals gain an advantage by changing the landscape within previously constrained environments.[1]

In the continually growing transcatheter aortic valve replacement (TAVR) market, Ziehm Imaging supports hospitals' needs with its RFD Hybrid System, enabling doctors to image TAVR cases in the same manner as with a higher cost-fixed system.[1]

Because the hybrid system is smaller in size, providers can place it within an operating room (O.R.) and eliminate the need for an additional, costly hybrid room. This simultaneously frees up a reserved O.R. suite, especially important if a TAVR case has an event such as a periventricular leukomalacia. Eliminating the need for a second room allows O.R. management to work the TAVR caseload into the O.R. schedule, and the fixed room can be utilized for more mainstream cardiac cases. Enabling this increased capacity change with the use of the Ziehm Imaging Hybrid System allows more throughput for the TAVR teams, while maintaining a high standard of care.[2]

> Because the hybrid system is smaller in size, providers can place it within an O.R. and eliminate the need for an additional, costly hybrid room.

Additionally, the Ziehm Hybrid RFD System is in use within hospitals' structural heart areas. The CMOS detector's pixel pitch allows for fine-detail imaging that enables physicians to match their 3D image to the real-time image created by the RFD system, saving valuable time and resources in endovascular abdominal aortic aneurysm repair and fenestrated endovascular aortic aneurysm repair procedures.[3]

The RFD Hybrid System is technology that improves the operations of surgery rooms and helps providers deliver higher quality TAVR and cardiac procedures.

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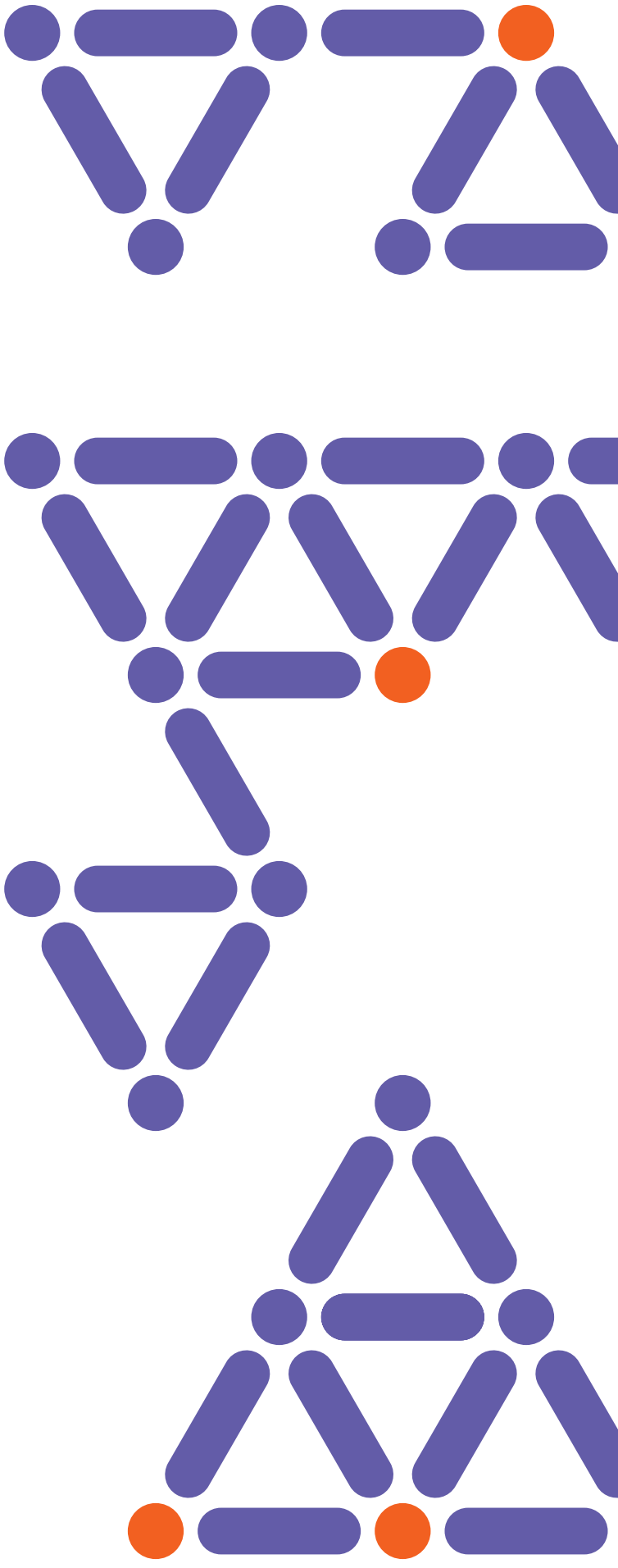
As the nation's largest member-driven health care performance improvement company, Vizient provides solutions and services that empower health care providers to deliver high-value care by aligning cost, quality and market performance. With analytics, advisory services and a robust sourcing portfolio, we help members improve patient outcomes and lower costs.



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