Artificial Intelligence, Machine Learning, and Imaging

Educational Briefing for Imaging Leaders

What is Artificial Intelligence and Machine Learning?

Artificial intelligence refers broadly to the ability of machines to perform functions which typically require human intelligence. All current applications of AI fall into the category of narrow AI, or AI that is able to perform a certain task or series of tasks with limited scope, as opposed to general AI, which could solve wide-ranging challenges with minimal prior direction from humans.

Machine learning is a sub-field of artificial intelligence and is defined as computing techniques that allow a machine to learn to do a task by observing real data and making predictions about future outcomes. Machine learning systems take large volumes of data, analyze it, and propose a model based on the relationships that were found within the data. In recent years, a particular subset of machine learning that relies on neural networks, termed deep learning, has led to particularly rapid advances in certain AI applications, such as image recognition.

Why Is Machine Learning a Key Issue for Imaging?

- Machine learning algorithms have already found niche roles in imaging: As these algorithms continue to improve, machine learning may become commonplace in many imaging departments and radiology groups.
- Technology vendors are rapidly developing and marketing machine learning software: Imaging leaders and radiologists must be prepared with an understanding of these new technologies.
- Machine learning algorithms offer a chance to differentiate through improved quality and efficiency: Imaging leaders that ignore or reject adoption of machine learning may eventually find themselves at a competitive disadvantage.

Machine Learning Applications in Imaging

Current Uses
- CAD algorithms for detection and classification
- Natural language processing in report generation
- Measurement and quantification of various bodily processes
- Intelligent worklist management with identification of urgent cases based on image analysis

Future Uses
- Pre-analysis of all images to provide additional data to radiologist at time of review
- Full analysis and diagnosis of images using disease-specific algorithms

How Can Imaging Leaders Consider and Prepare for Machine Learning Adoption?

- Explore the efficiency and quality benefits that machine learning algorithms can provide to support patient care
- Understand scope of machine learning software being considered, as many machine learning algorithms have narrow applications for specific modalities and diseases
- Engage all stakeholders when planning to purchase machine learning software to highlight benefits while reducing anxiety and cultural resistance
- Ensure necessary IT infrastructure is in place to maximize the benefits a machine learning algorithm can provide
- Plan for extended implementation timeline for machine learning software to account for changing IT requirements and newly developed algorithms

Benefits of Machine Learning

**Greater Efficiency**
- Automate certain basic tasks such as measurement
- Facilitate decision-making during a radiologist’s read
- Improve workflow outside of reads with prepopulated templates, natural language processing

**Improved Outcomes**
- Improve diagnostic accuracy, prevent medical errors
- Provide additional information, segmentation to radiologists during read
- Enable faster reads for urgent cases

Challenges for Machine Learning Implementation in Imaging

**Cultural Resistance**
- Perception among some radiologists that increased reliance on machine learning in radiology will directly lead to a diminished role, fewer jobs for radiologists
- Belief that machine learning is not developed enough to have a meaningful impact or be worth the investment

**Regulatory Barriers**
- The US Food and Drug Administration (FDA) labels devices that conduct diagnostic interpretation as class III, which makes approval a more difficult and time consuming process than class II devices that just offer features of measurement
- FDA recently announced new proposals for reviewing AI applications, including evaluating new applications by comparing them to a set of performance measures instead of requiring direct comparison to existing devices. This may decrease future approval times.

**Limited Current Utility**
- Effective machine learning algorithms require massive inputs of clinical and peer-reviewed data in order to evaluate new images accurately
- Hyper-specialized use cases and proliferation of vendors have led to a fragmented market without comprehensive AI solutions

Early Applications of Machine Learning to Improve Radiologist Workflow

1. **Natural language processing for speech recognition**
   As radiologist dictates, software suggests changes to reduce transcription errors, checks for inconsistencies, such as referring to indication on “left” and “right” side

2. **Worklist management, exam escalation**
   As exams hit worklist, software orders them based on urgency, subspecialty, and continuously adjusts triage rules for new cases; more advanced software can review, prioritize exams with suspected critical findings

3. **Quantitative measurement solutions**
   As exam is read, quantitative measurements are captured automatically for radiologist; advanced solutions may offer decision support based on recorded measurements

4. **Clinical information briefings**
   Before images are read, AI algorithms pull information from the EMR, synthesize patient background, reason for exam, any other clinical information into single, easy-to-read summary for radiologists


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What Is Health Care Consolidation?

Over the past few years the health care industry has seen unprecedented merger and acquisition activity. In 2017, health system M&A\(^1\) grew by 13% to 115 announced deals, setting a new industry record. However, this trend isn’t limited to horizontal health system integration. Multiple vertical integration deals, such as plans for CVS to purchase Aetna, may be finalized in 2018. This flurry of consolidation has largely been driven by organizations attempting to maintain margins while facing declining reimbursement and uncertainty around current health care laws.

The growth of health systems has changed the day-to-day job of the imaging leader. In fact, the majority of surveyed leaders reported that they are part of a multi-hospital health system and oversee multiple imaging sites of care.

Hospital and Health System M&A Activity

<table>
<thead>
<tr>
<th>Total Deal Volume, 2013 - 2017</th>
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</thead>
<tbody>
<tr>
<td>2013</td>
</tr>
<tr>
<td>2014</td>
</tr>
<tr>
<td>2015</td>
</tr>
<tr>
<td>2016</td>
</tr>
<tr>
<td>2017</td>
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</tbody>
</table>

System Strategy Reality for Imaging Leaders

- 94% of Imaging Performance Partnership members part off a multi-hospital health system\(^2\)
- 64% of imaging directors who are part of the Imaging Performance Partnership membership oversee multiple imaging sites of care

How Is Consolidation Reshaping the Health Care industry?

1. **Delivery networks are expanding with the goal managing total cost of care:** Vertical integration particularly boosts consumers’ access to lower-cost, non-hospital health care options by broadening the availability of ambulatory and home-based service providers.

   This aligns with other market pressures shifting care to lower-cost, lower-acuity settings. Just last year, Anthem announced that they would no longer pay for certain hospital-based imaging procedures that could otherwise occur in outpatient settings. Integration deals aren’t just restricting access to unnecessary higher-cost settings, like Anthem did, they’re also looking to more seamlessly coordinate with the providers and care settings they want consumers to use.

2. **Higher quality care and reduced utilization of services expected:** Consolidation ideally should expand services offered and allow for greater clinician specialization, resulting in improved care quality. At the same time, with former competitors merging, consolidation should result in service and equipment rationalization within markets.

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\(1\) Mergers and acquisitions.

\(2\) According to Imaging Performance Partnership 2016 Analysis.

How Can Imaging Leaders Respond to Health Care Consolidation?

Imaging is well positioned to effectively respond to health system consolidation by delivering standardized, efficient care across settings and geographic areas. For example, many organizations imaging programs already have standard slot times for exams and standardized clinical protocols.

Moreover, success in imaging can also bring benefits across the broader system. Imaging spans most hospital departments across inpatient, emergency, and outpatient settings and interacts with almost every service line. Therefore, standardization in imaging can have ripple effects beyond the service line.

The Case for Starting with Imaging

Significant Opportunity for Systemization, Standardization in Imaging

- Standard slot/exam times
- Relatively easy to standardize clinical protocols
- Standard equipment, limited number of physician preference items
- Supports all major clinical services lines
- Provides services across care settings (inpatient, outpatient, ED)

To achieve the benefits of scale, imaging leaders should follow these five discrete steps:

1. **Define system-wide leadership structures**
   Leadership lays the groundwork to make the other four goals possible—standardization can’t occur without a centralized roll-out team in place.

2. **Engage in system-wide strategic planning**
   Imaging leaders often think about strategy in terms of their own individual sites, but successful integration depends on having a consistent strategy for the entire system.

3. **Invest in enterprise imaging IT solutions**
   Enterprise imaging is the reading, storing, and management of all images and imaging data generated across all departments in the health system. Investing in enterprise imaging can help directors manage imaging in a way that supports the entire health system.

4. **Establish consistent staff expectations**
   With consistent staff training, expectations, and policies across sites, staff can be easily shared between sites based on volume, improving productivity for the entire health system. This opportunity is especially significant for imaging—almost one-third of imaging departments report being understaffed.

5. **Achieve financial integration**
   Financial integration means that the imaging program acts as a single business unit, where financial performance is transparent and strategy focuses on overall imaging system success. Financially integrated programs prioritize system performance and motivate individuals to help meet system goals.

Access case studies, webconferences, and resources on these topics at advisory.com/ipp/systems
Digital Breast Tomosynthesis (DBT)

Educational Briefing for Imaging Leaders

What Is DBT?
Digital breast tomosynthesis, or DBT, is a three-dimensional (3D) mammogram used to detect breast cancer by capturing multiple images of the breast in a single data set.

Currently DBT is used in addition to mammography in breast cancer screening and diagnosis. One study demonstrated that using DBT and digital mammography resulted in a reduction in patient recall rate and an increase in cancer detection over digital mammography alone. Additional studies are underway to assess DBT as a sole imaging screening modality to detect breast cancer. There are currently no specific patient populations recommended to receive DBT, though there is some evidence that DBT might improve cancer detection in women with dense breast tissue.

In 2015, Medicare began reimbursing DBT in conjunction with digital mammography. Some private payers are covering DBT, but resistance continues among those who continue to consider it experimental.

Why Is DBT a Key Issue for Imaging?

• As a screening program, DBT represents an area of growth for imaging and may help elevate imaging’s role in population health: Adding DBT to other women’s imaging services can allow imaging programs to gain market share, establish new referral streams, and become patient’s provider of choice. Along with other screening programs including mammography, DBT can help to reduce total cost of care by detecting breast cancer in early stages.

• The growth of dense breast notification legislation may drive patients to seek out programs that offer DBT: States are increasingly passing legislation requiring providers to notify patients of dense breast tissue. As evidence suggest that DBT may improve cancer detection in women with dense breasts, patients may proactively look for programs that offer DBT as a screening option.

• DBT has the potential to become standard of care for breast cancer screening: Research is ongoing about the effectiveness of DBT as the sole imaging screening for breast cancer. As researchers publish the results of these studies, DBT may become a more established modality, potentially replacing mammography.

Since FDA Approval

<table>
<thead>
<tr>
<th>3M</th>
<th>Number of women in the US who receive DBT screenings each year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,000</td>
<td>Number of radiologists trained in DBT in the US</td>
</tr>
</tbody>
</table>

What Should Imaging Leaders Do to Ensure a Successful DBT program?

- Identify if there are issues with private payer reimbursement for DBT. The American College of Radiology has resources to use when working with private payers to encourage coverage.
- Consider if your system has maximized its potential volumes of DBT to referring physicians or potential patients.
- Ensure that system infrastructure is prepared for the addition of DBT, including PACS compatibility, image transfer capabilities, and storage requirements.
- Provide technologists and radiologists appropriate training to conduct and read exams. DBT is included under the Mammography Quality Standards Act and each currently approved DBT system is considered a separate mammographic modality. While some training is considered general for DBT, system-specific training is also required.

Challenges Facing DBT Programs

- **High cost**: DBT units cost between $425K-$475K, a 20% increase over 2D only systems. Some 2D systems can be upgraded for $100K-$150K per unit. Currently, there are three approved DBT systems: Hologic Selenia Dimensions, GE SenoClaire, and Siemens Mammatom Inspiration.

- **Longer turnaround times**: Some studies have shown that read times for DBT are twice as long as mammography. However, on average, radiologists adapt to reading DBT exams within 30 days.

- **Higher radiation dose**: Patients undergoing both mammography and DBT are exposed to a higher dose of radiation, though it still falls under the limits required by the FDA. There are also software solutions that create a 2D image out of the 3D image created by DBT. This process reduces the radiation dose the patient receives.

- **Private payer reluctance**: Some private payers are reluctant to cover DBT. Absent this coverage, some providers are charging an average of $69 per screening. Others choose to offer DBT as a free service to all patients, or to those patients who express cost as a concern.

CMS Reimbursement for DBT

<table>
<thead>
<tr>
<th>CMS Policy for Screening DBT</th>
<th>CMS Policy for Diagnostic DBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBT screening CPT code (77063) in conjunction with digital screening mammography G Code (G0202)</td>
<td>G Code (G0279) for diagnostic DBT as an add-on to the existing digital mammography G Codes</td>
</tr>
</tbody>
</table>

**CMS 2016 Tomosynthesis Reimbursement**

<table>
<thead>
<tr>
<th>Exam Type</th>
<th>Film</th>
<th>Digital</th>
<th>Digital with DBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening Mammogram</td>
<td>$82.70</td>
<td>$135.07</td>
<td>$191.32</td>
</tr>
<tr>
<td>Unilateral Diagnostic Mammogram</td>
<td>$90.22</td>
<td>$129.70</td>
<td>$185.95</td>
</tr>
<tr>
<td>Bilateral Diagnostic Mammogram</td>
<td>$116.00</td>
<td>$164.81</td>
<td>$221.06</td>
</tr>
</tbody>
</table>

**DBT Grows Volumes, Improves Results Delivery-An Example from Cyrus Hospital**

Cyrus Hospital began offering DBT at no additional charge to all patients and experienced a 50% drop in screening recalls. With this newly freed capacity, Cyrus has been able to increase volumes, accommodate new patients, and accelerate diagnoses with same-day results delivery for DBT, ultrasounds, and biopsies.

**1** Begin Offering DBT
Free DBT screening exams offered to all patients

**2** Reduction in Callback
50% decline in callbacks from greater accuracy

**3** Increase in New Patients
DBT marketing attracts new patients:
- 10% increase in year 1
- 25% increase in year 2

**Offer Same-Day Results**
Used decrease in callbacks to accommodate new patients, offer same day results


1) Pseudonym.
Enterprise Imaging Technology

Educational Briefing for Imaging Leaders

What Is Enterprise Imaging Technology?

“The reading, storing, viewing and management of all images and imaging data generated by all providers across all the departments in the health care system”

Enterprise imaging technology differs from the current state of image storage as it encompasses all images generated throughout a health system, including radiology, cardiology, dermatology, GI, and ED. It includes DICOM images, scope camera recordings, cell phone camera pictures, and any other images generated across a health system’s service lines.

The elements common to enterprise imaging technology infrastructure are an enterprise-wide viewer, intelligent worklists, a vendor neutral archive, and a health information exchange.

Why Is Enterprise Imaging Technology a Key Issue for Imaging?

• **IT interoperability is a priority for C-Suite executives.** According to a recent survey of C-Suite executives, increasing IT Interoperability was noted as one of the top three issues that hospital executives felt was both the most challenging and most important for organizational success. Additionally, IT interoperability is a key component in meeting legislative and regulatory requirements and advancing population health management.

• **Enterprise imaging technology can support other key goals of the imaging service line, including improved productivity, increased subspecialty reads, and population health management.** By breaking down the traditional PACS silos, enterprise imaging streamlines radiologists’ workflow and allows for greater subspecialty coverage, resulting in improved productivity for radiologists. Implementing all elements of enterprise imaging can allow for better management of incidental findings and reduce unnecessary or duplicative scans.

• **Imaging leaders should play a leadership role in the implementation of enterprise imaging solutions.** As the largest image-generating service line in a health system, radiology can be an important voice in ensuring that the infrastructure created will meet the needs of the health system.

MACRA Proposed Rule Encourages Enterprise Imaging Technology

CMS incent providers to make DICOM images available to external health care facilities, and to search for DICOM images from external facilities prior to ordering an imaging exam for a patient. This level of interoperability is required for CT scans

• Adopting a vendor neutral archive and a health information exchange can assist in this interoperability

What Should Imaging Leaders Do to Assist their Health System in Implementing Enterprise Imaging Technology?

- Ensure strong connections with health system IT departments to ensure that IT department understands imaging’s storage and technology needs.

- Deploy enterprise viewing solutions, including a universal workstation and intelligent worklists, to provide system-wise accessibility of images throughout the system.

- Implement a vendor neutral archive across all image-generating service lines in the enterprise to support both DICOM and non-DICOM clinical data.

- Consider opportunities to implement, or participate in, a health information exchange. This will increase the scope of your efforts and allows your enterprise imaging infrastructure to benefit all systems within your market.

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1 Digital Imaging and Communications in Medicine

1 Universal Viewer with Intelligent Worklist

A universal viewer is a workstation that provides unified system-wide visibility into disparate PACS, allowing radiologists to view all images throughout a system. A universal viewer can increase productivity, as radiologists are no longer restricted to volumes at a particular site, but can instead read scans from any site across the system.

In addition to the technological capability to read all scans, a universal viewer can also help ensure that the correct radiologist is reading each scan. This is done through intelligent worklists, which use algorithms to assign a scan to the correct radiologist considering factors including, subspecialty, worklist length, time, and facility.

A benefit of incorporating a universal viewer is that it does not require the health system to purchase new PACS or storage systems. Rather the universal viewer works with the existing infrastructure to serve as a linkage between systems. This can make deploying a universal viewer a good first step in moving towards enterprise imaging.

2 Vendor Neutral Archive (VNA)

A VNA is an enterprise solution that provides long-term storage of clinical data that can be accessed by any PACS or other systems that can view or create clinical content using open standards. While a VNA has many of the same functions as traditional PACS in terms of image storage, its primary benefit is the ability of the VNA to store images in many different formats, including DICOM, scope camera recordings, and cell phone images and videos.

While a health system can choose to deploy a VNA in just one or more departments, the most successful VNA deployment is enterprise-wide, encompassing all image formats from any image-generating service line in the health system. Common service lines include radiology, cardiology, GI, ophthalmology, pathology, and ED. By engaging in this system-wide approach, the health system can gain the greatest benefits including lowered storage costs, improved collections and, increased physician access to images.

3 Health Information Exchange

The health information exchange is the most expansive step in enterprise imaging. If deployed widely, it can benefit all systems within a market. Using a health information exchange, information about a patient’s scan history and results can be tracked across multiple health systems. This can be a powerful step in elevating the role of imaging in population health management, particularly in markets where patients frequently receive care within multiple systems. The health information exchange allows physicians to review a patient’s previous scans regardless of the facility of origin. This can help reduce unnecessary scans and manage incidental findings.

Enterprise Imaging Technology in Practice

![Diagram showing patient receiving screening mammogram, health information exchange identifying prior mammograms, and patient receives mammography results.]

Mammogram recall rate by number of prior scans consulted:
- 16% No prior mammograms
- 7.8% One prior mammogram for comparison
- 6.3% Two or more prior mammograms for comparison

Imaging Screening Programs
Educational Briefing for Imaging Leaders

What Are Screening Programs?
Screening services detect diseases early, resulting in improved patient outcomes and reduced total cost of care. Imaging procedures are advantageous for disease screening, as they are minimally- or non-invasive with extremely low patient complication rates. The most common imaging screening program is mammography with clear success in improving early detection and reducing mortality of breast cancer. As the technology becomes more established and screening benefits clear, organizations are expanding their screening services to detect more diseases, such as lung and colon cancer.

Why Are Screening Programs a Key Issue for Imaging?
• **Improves outcomes with early detection:** Screening programs focus on asymptomatic patients and allow providers to detect disease earlier, prevents the disease from advancing before patient receives treatment. Screening programs are proven to increase survival rate and decrease mortality. For example, five year survival rates for non-small cell lung cancer detected in Stage 1A is 49%, compared to 14% for Stage IIIA and 1% for Stage IV.

• **Elevates imaging’s role in population health:** Screening programs help organizations accomplish the two goals of population health management: improve quality and reduce cost. Not only does early detection improve patient outcomes, but also decrease total cost of care which is increasingly important as value-based payment models emerge. As an example, early stage breast cancer treatment on average costs $14,000 versus $61,000 for late stage treatment.

• **Enables imaging volume growth:** Imaging programs generally rely on referrals. Screening programs allow imaging to establish new referral streams, gain market share, and become patients’ provider of choice.

• **Contributes downstream revenue to health system:** Screened patients with positive or incidental findings will likely go to the health system for follow-up procedures and treatment, resulting in downstream revenue.

Action Steps for Imaging Leaders to Grow Screening Programs

- **Evaluate patient population:** To determine viability of new screening services, leaders should examine market demographics and health system’s patient population. Consider offering screening services that meet market needs.

- **Collaborate with other service lines:** Successful screening programs rely on multidisciplinary support. It is imperative that imaging works with leaders and physicians from related specialties to offer robust services and build a holistic program. For example, lung cancer screening programs require radiology, pathology, oncology, and pulmonology.

- **Engage referring providers with a clear message and streamlined referral process:** Imaging must educate providers to identify appropriate patients for screening exams, as well as prepare providers to educate patients about the screening process. The referral process should also be clear and simple, minimizing referring provider burden.

- **Partner with local entities to improve compliance and educate patients:** Imaging leaders should collaborate with other health care organizations such as ACOs and retail clinics to improve screening compliance rates for high-risk patients, and in turn increase early diagnoses. Partnering with local entities such as churches, employers, and veteran groups helps educate and invite new patients into screening programs.

- **Track success:** Imaging leaders can calculate the value from screening programs to justify the investment to health system leaders. Focus on metrics such as stage of diagnoses, downstream revenue, and reduction in cost of care.
When Do Payers Cover Screening Services?

The United States Preventive Services Task Force (USPSTF), an independent volunteer panel of experts, reviews clinical studies for screening programs and makes recommendations on reimbursement. The USPSTF assigns each recommendation a letter grade:

- **A**: recommended; payer coverage
- **B**: recommended; payer coverage
- **C**: selective offering recommended
- **D**: not recommended
- **E**: insufficient evidence to assess balance of benefits and harms

Breast Cancer Screening: Mammography is the most common imaging screening procedure, with two-thirds of women over 40 receiving the breast cancer exam in the past two years.

- **Screening method**: Mammogram; Digital Breast Tomosynthesis (DBT)
- **Eligibility**: There has been confusion in the market since the USPSTF changed its recommendation from annual screening for all women over 40 to biennial screenings for women 50-74. This recommendation was so controversial that the Department of Health and Human Services (HHS) followed by Congress decided to keep the 2002 guidelines, meaning Medicare covers annual exams for women over 40.
- **Breast-density considerations**: Between one-third and one-half of women have dense breast tissue, which can obstruct a radiologist’s ability to see a cancerous lesion on a mammogram and in these cases an ultrasound, MRI, or tomosynthesis may be ordered. Twenty-two states have passed legislation requiring providers to notify patients of dense tissue.
- **Reimbursement**: Medicare and private payers cover mammography for eligible patients. Following Medicare’s lead, most private payers have agreed to cover costs annual mammograms for all women over 40. Out-of-pocket costs are $0 for insured patients.

Low-Dose CT Lung Cancer Screening: The number of lung cancer screening programs have tripled in the past three years, providing the estimated 9 to 15 million eligible patients an opportunity for early detection and dramatically improved survival rate. In February 2015, Medicare approved lung cancer screening counseling and LDCT lung cancer screening as an additional preventative benefit with no cost sharing for patients.

- **Screening method**: Low-dose chest CT without contrast
- **Eligibility**: Annual screenings for adults 55-80 with history of smoking
- **Reimbursement**: Medicare and private payers cover shared decision making visits and LDCT lung cancer screening for eligible patients performed after February 2015; out-of-pocket costs are $0 for eligible insured individuals

### HCPSC Code | Descriptor | 2018 MPFS Payment | APC Code | Descriptor | 2018 HOPPS Payment
--- | --- | --- | --- | --- | ---
G0296 | Counseling visit to discuss need for lung cancer screening LDCT | $29 | 5822 | Level 2 Health and Behavior Services | $72
G0297 | LDCT for lung cancer screening | $242 | 5570 | Computed Tomography without Contrast | $62

CT Colonography: CT Colonography (CTC), also called virtual colonoscopy, is an alternative, minimally-invasive procedure to the traditional colonography to screen for polyps in the large intestine. Once polyps are detected, the more invasive colonoscopy may be recommended for follow-up.

- **Screening method**: CT abdomen and pelvis
- **Eligibility**: Adults ages 50 to 75 are eligible for colon cancer screening annually
- **Reimbursement**: Private payers cover CTC for eligible patients; reimbursement levels vary state-by-state

### CTC Testing as screening modality

Population | USPSTF Grade
--- | ---
CTC testing as screening modality | A

Source: USPSTF http://www.uspreventiveservicestaskforce.org/
Imaging Performance Partnership research and analysis.

May 2019

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1) Unless grandfathered in.
2) Non-facility payment rate.
Medicare Advantage
Educational Briefing for Imaging Leaders

What Is Medicare Advantage?
Medicare Advantage (MA), also known as Medicare Part C, is a type of insurance plan funded by the Centers for Medicare and Medicaid Services (CMS) but administered by a private payer. MA plans cover all traditional Medicare benefits (Parts A and B) and many also include prescription drug benefits (Part D). CMS offers the MA payer a lump sum, determined by county benchmarks, enrollees’ risk scores, and the plan’s quality rating, to cover Part A and B benefits. If beneficiaries’ health care costs exceed the capitated rate, the sponsoring organization must cover the difference. However, if costs fall below the target, the organization can share in the savings.

MA plans are gaining popularity among both enrollees and providers. Between 2007 and 2017, the proportion of Medicare beneficiaries enrolled in MA plans grew from 19% to 33%. By 2025, experts expect about 30 million, or about 40% of Medicare beneficiaries, to be enrolled in MA plans. While MA plans have historically been offered by commercial insurers, a growing number of health care providers are taking advantage of the expanding MA market either by negotiating a stake in existing plans or sponsoring their own plans.

How Do Medicare Advantage Plans Pay Providers?
CMS contracts with payers to offer a variety of Medicare Advantage plans, including Health Maintenance Organization Plans (HMOs), Preferred Provider Organization Plans (PPOs), Private Fee-for-Service Plans (PFFSs), and Special Needs Plans (SNPs). In 2016, HMOs accounted for the majority (64%) of total Medicare Advantage enrollment.

Why Is Medicare Advantage a Key Issue For Imaging?
1. MA insurers often negotiate risk-based contracts with providers in order to achieve savings below their payment from CMS. Providers sponsoring their own MA plans are directly incentivized to manage costs. As a result, there is evidence (see next page) that Medicare Advantage beneficiaries exhibit lower healthcare utilization overall, and specifically lower imaging utilization, than traditional Medicare beneficiaries.

41% Proportion of total MA payments to physicians that include risk1, 2

2. CMS’s Star Ratings program ties MA plans’ eligibility for bonus payments to their quality scores. These scores include preventive care metrics such as screening, which directly involve imaging. Providers that sponsor their own MA plan or work closely with an MA insurer (e.g. through a narrow-network HMO contract) need to focus on maintaining and/or improving the plan’s star rating.

How Can Imaging Leaders Succeed Under Medicare Advantage Contracts?
- **Focus on utilization management:** Learn the typical high-cost imaging utilization trends for the Medicare population at your organization and nationally. Then, choose meaningful clinical targets for utilization management and design initiatives to address them. Leverage clinical decision support (CDS) tools in all care settings to support utilization management efforts.
- **Invest in screening and follow-up:** To help maintain and/or improve MA star rating, imaging leaders should focus on maximizing screening rates among eligible patients, as well as improving follow-up on incidental and other imaging findings to elevate overall quality of care.

MA Enrollment to Nearly Double by 2025
Total Enrollment and Percentage of Total Medicare Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Enrollment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>2005</td>
<td>19M</td>
<td>33%</td>
</tr>
<tr>
<td>2017</td>
<td>31M</td>
<td>41%</td>
</tr>
<tr>
<td>2027</td>
<td>71%</td>
<td></td>
</tr>
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</table>

71% MA enrollment growth since 2010

MA Penetration Varies by State, 2017
Total MA Enrollment as a Percent of Total Medicare Population

Medicare Advantage Impact on Imaging Providers

Lower Imaging Utilization for Medicare Advantage Patients

Lower imaging procedure utilization for Medicare Advantage than traditional Medicare

19%

Lower imaging test utilization for Medicare Advantage than traditional Medicare

11%

Medicare Advantage Metric Areas Contributing to Star Rating

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staying Healthy: Screening, Tests, and Vaccines</td>
<td>Screening and vaccines rates, maintaining physical and mental health</td>
</tr>
<tr>
<td>Managing Chronic (Long Term) Conditions</td>
<td>Medication review, functional status, chronic condition care, and all-cause readmissions</td>
</tr>
<tr>
<td>Member Experience with Health Plan</td>
<td>Accessibility and timeliness of care, care coordination and customer service</td>
</tr>
<tr>
<td>Member Complaints and Changes in the Health Plan's Performance</td>
<td>Plan quality improvement, as well as member retention and complaints</td>
</tr>
<tr>
<td>Health Plan Customer Service</td>
<td>Appeals review process and call center capacity</td>
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</tbody>
</table>

Health Care Consumerism

Educational Briefing for Imaging Leaders

What Is Health Care Consumerism?
Patients are beginning to demonstrate consumer-like behavior, seeking price transparency and expecting high levels of service in exchange for their health care dollars. Patients are increasingly on the hook for their own health care costs due to rising deductibles and the prevalence of high deductible health plans. Additionally, patients can now access information like pricing data and patient reviews prior to seeking care. In order to capture the consumer population, imaging providers must meet new consumer demands.

What Are Patients Shopping For?

Emergent Care
“I have an urgent injury or illness that must be addressed immediately”

Shoppable Procedures
“I need to have a procedure done, but it’s not urgent—where do I go?”

Enhanced Management
“I want a relationship with a provider to manage my ongoing health needs”

Why Is Patient Consumerism a Key Issue for Imaging?

• **Non-urgent imaging services are “shoppable”**: As imaging procedures are typically non-urgent, patients possess an opportunity to shop for value. Imaging services typically fall within the deductible range, leaving patients on the hook for the entire cost, and making price a major factor in care decisions.

• **Imaging services have obvious price discrepancies**: Imaging exams are a primary target due to obvious price variability by site and provider. A recent survey found that there was a 430% cost variance for MRI and a 566% variance for CT. Imaging performed at free-standing clinics present low-cost alternatives to hospital-based outpatient departments due to different billing systems.

• **Patients shop based on price due to poor understanding of quality in imaging**: Unlike many other specialties, clearly defining, tracking, and demonstrating quality in imaging is particularly challenging; this puts a greater emphasis on cost. In fact, our 2015 Imaging Consumer Preferences survey found patients consistently rank cost as more important than quality in choosing an imaging provider.

Four Main Drivers of Consumerism in Health Care

- Growing patient accountability for cost
- Rise of price transparency
- Proliferation of online patient experience reviews
- Heightened expectations for convenience

How Can Imaging Leaders Respond to Patient Consumerism?

- **Understand patient preferences**: Patient preferences for imaging differ among demographics and cohorts. With an understanding of consumer demands in your market, you can develop strategies to meet patient expectations.

- **Control and monitor online presence**: Patients regularly post about their experience on social media and websites like Yelp, which new patients view to make decisions about where they seek imaging care. Imaging leaders should ensure your online presence will attract new consumers rather than push them away.

- **Provide pricing information to patients**: Among all demographics, imaging patients want access to pricing information before receiving care. Imaging programs must develop a method to provide accurate price estimates to patients, or risk losing them to competitors.

What Do Imaging Consumers Want?

Imaging services are a prime target for the increasingly consumer-minded patient. For outpatient imaging programs to retain volumes and sustain healthy growth, imaging leaders must understand what the consumer wants. Through our 2015 Imaging Consumer Preference Survey, we analyzed the results of more than 2,000 respondents to determine what matters most and least to imaging consumers.

The imaging facility attributes tested were grouped into six into categories: quality, latest technology, cost, access, service, and reputation.

Top Ten Most Preferred Imaging Center Attributes According to Patients

n = 2,040

1. My out of pocket costs will be less than $30
2. I will receive my results on the same day as my imaging exam
3. The provider is in-network for my insurer
4. The imaging facility has the most advanced level of technology for MRI
5. A radiologist who is specialized in reading this type of MRI will interpret my scan
6. Once I arrive at the facility, I will have to wait 5 minutes or less before I receive my imaging exam
7. The facility was recommended by my doctor
8. The imaging provider provides me with comprehensive and clear understanding of MRI procedure, medical condition, diagnosis
9. The imaging facility’s quality scores are far above industry average

Top Ten Insights from the 2015 Imaging Consumer Preferences Survey

1. The imaging provider of choice delivers on all fronts.
2. There are many ways to attract patients, but there is one main way to lose them.
3. Patients are keeping tabs on out-of-pocket costs and in-network status.
4. Talk about money early in the process.
5. Cost and access trump a physician recommendation.
6. Your patients are consulting Yelp for more than just restaurant reviews.
7. Patients want same-day results.
8. Patients would rather wait for an appointment than wait at your facility.
9. When it comes to extended hours, evenings and weekends are equally preferred.
10. Know the age of your target audience—and plan accordingly.

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1) Survey used MaxDiff conjoint methodology. Participants were required to make trade-offs among 67 different imaging facility attributes, revealing the relative importance of each. This methodology allows researchers to understand the magnitude of difference between ranked attributes and forces respondents to choose between attributes, preventing ceiling effects.

View all the results from our Imaging Consumer Survey Results Explorer to learn more about:

- The most important imaging center attributes
- How much consumers prefer one attribute over another
- How preferences differ across demographics and cohorts

Source: Imaging Performance Partnership interviews and analysis.

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