A Brighter Future Lies Ahead for AI Funding in Radiology

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Technologies based on artificial intelligence (AI) have been shown to both speed interpretation and elevate human performance throughout the radiology environment. Indeed, many such tools are already being used to improve workflows, reduce contrast usage and radiation dose, and shorten report turnaround times.

Nevertheless, questions surrounding payment models and return on investment (ROI) on the use of AI-based tools have been powerful barriers to their widespread implementation within radiology.

For example, will interpreting physicians pay out of their own pockets for a technology that triages emergent cases, facilitates interpretation by suggesting diagnoses, detects off-search findings, and validates reports? If the combination of clinician and machine improves outcomes, will—should—malpractice insurers support that teamwork? And could—should—payers award higher payouts to imaging practices that employ AI?

While CMS determinations have shifted the paradigm for AI developers to clinical end points like reduction of of costs and downstream procedures, as well as outcomes, they also could lead to reimbursement for other AI-based applications, particularly those that improve care and enhance the patient experience.

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Developments of the past several years are beginning to answer these questions and provide cause for optimism in the radiology community.

In 2017, the Centers for Medicare and Medicaid Services (CMS) awarded a new technology ambulatory payment classification for Heartflow's fractional flow reserve (FFR)/CT Analysis software. The CMS now reimburses practices $1,450.50 for the technical component of tests using the software, which helps to assess patients with suspected coronary artery disease.

In August, the CMS announced CPT® code 9225X which, beginning Jan. 1, authorizes the use of, and reimbursement for, autonomous AI to diagnose diabetic retinopathy and macular edema in primary care and other healthcare settings. This step, specifically focusing on Digital Diagnostics' FDA de novo-authorized IDx-DR, marks a major milestone for population health and the ability to expand specialty diagnoses into primary care settings.

Third, in a groundbreaking ruling issued in September, the CMS

NTAP: The Exception to the Rule

The New Technology Add-on Payment (NTAP) was established in 2001 as an exception to the Medicare Severity-Diagnosis Related Group (MS-DRG), which sets standard reimbursements for medical procedures and technologies. NTAP status is granted by the CMS for new and high-priced technologies that provide a substantial clinical benefit over existing technologies and are not currently covered under MS-DRG. In general, to qualify for NTAP status a technology or service must meet three criteria: 1) it must be new; 2) the standard DRG rate must be deemed insufficient to cover the costs of implementing the service or technology; and 3) the service or technology must demonstrate substantial clinical improvement over existing services or technologies. NTAP status lasts no longer than three years for a specific indication. —*LT*

granted New Technology Add-on Payment (NTAP) status to Viz.ai's Viz LVO, a deep learning (DL) algorithm that analyzes CT angiography exams for large vessel occlusion (LVO)-related stroke and immediately communicates that information to stroke treatment teams.

The NTAP program was established in 2001 (see sidebar) to support adoption of cutting-edge technologies that demonstrate substantial clinical improvement over existing tools and to ensure early availability to Medicare patients.

Viz.ai demonstrated that Viz LVO significantly reduces time to treatment and improves patient outcomes in stroke. As a result, Medicare will pay $1,040 over and above the standard DRG rate per use of the algorithm in stroke patients.

The company estimates about half of Medicare patients who receive Viz LVO analysis will qualify for payment; it also believes private payers may consider reimbursement in the future. Importantly, the standard reimbursement for CT interpretation is not affected by the NTAP. Other vendors that offer stroke-related AI applications, such as AIDOC and RAPID, are also eligible for, and should ultimately benefit from NTAP.

While CMS determinations have shifted the paradigm for AI developers to clinical end points like reduction of costs and downstream procedures, as well as outcomes, they also could lead to reimbursement for other potential AI-based applications, particularly those that improve care and enhance the patient experience. While they don't open the floodgates to widespread reimbursement, these decisions do represent the first trickles of success in the pursuit of increased funding for AI in radiology.

To be sure, how to pay for AI implementation in radiology remains a complex issue with many considerations; reimbursement decisions by CMS and private insurers remain critical for some radiology practices. For now, at least, the ROI on tools that augment the scanning process will come from quality, efficiency, and the value of a better patient experience.

Paying for Deep-Learning Advances in CT, MRI, and PET/CT

Deep learning-based tools for CT and MRI reconstruction are available from original equipment manufacturers (OEM) and third-party vendors.

With regard to CT, for example, dose-reduction tools from GE (TrueFidelity) and Canon (AiCE)permit reductions on par with or greater than predecessor iterative reconstruction techniques while preserving traditional image texture (noise power spectrum) and maintaining the quantitative integrity of traditional FBP techniques. Third parties offer similar vendor-agnostic solutions; they include AlgoMedica (PixelShine), which has a cooperative arrangement with Fujifilm.

Meanwhile, MRI technologies from GE (Air Recon DL) and Canon (AiCE) produce images that match or exceed conventional image quality. Subtle Medical, a third-party vendor, is marketing a DICOM-based, vendor-agnostic solution with similar impact. Early experience suggests DL-based MRI tools can reduce scan times by 50 percent or more. In addition, these powerful noise-reducing, structure-preserving, and often resolution-enhancing products deliver an overall boost in the performance of legacy systems (SubtleMR) and elevate expectations for newer systems.

Makers of CT scanners are offering DL packages with new purchases of high-end systems and for some mid-range models on a subscription basis. Original equipment manufacturers (OEMs) of MRI systems are, or will soon be, offering DL capabilities at 3T and 1.5T for their recent vintage and newest models.

Subtle Medical also offers a vendor-agnostic PET/CT solution that reduces time per bed position with significant positive impact on workflow and the patient experience. SubtlePET has been shown to de-noise scans conducted in as low as 25 percent of scan duration.

As a capital purchase, the hike in system price resulting from DL is modest and can be amortized over 10 years or so of operation. While third-party solutions can be offered on a per-use basis, the subscription model seems to be taking hold. ROI analysis of the current OEM subscription model is complicated, as it is only offered as part of a larger, non-obsolescence package.

However, a theoretical ROI analysis of the impact of a third-party, vendor-agnostic tool (SubtleMR) on a legacy scanner assumes a roughly 50% reduction in scan times, outpatient reimbursement rates and, depending on existing exam slot times, a 33-50% boost in capacity for a busy center. At approximate, somewhat volume-based subscription rates, the ROI could be as much as five to six times higher, in addition to the elevation of imaging standard and the value of the improved patient experience.

These post-market tools could be leveraged to extend the life of a legacy system and delay an upgrade by lifting its performance to that of its newer peers within or outside a practice, benefits that should be carefully considered in this challenging economic environment.

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