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Medicare Advanced Imaging Payment: Dysfunctional Policy Making

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USC-Brookings Schaeffer Initiative for Health Policy

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Editor's Note

This white paper is part of the USC-Brookings Schaeffer Initiative for Health Policy, which is a partnership between the Economic Studies Program at Brookings and the USC Schaeffer Center for Health Policy & Economics. The Initiative aims to inform the national health care debate with rigorous, evidence-based analysis leading to practical recommendations using the collaborative strengths of USC and Brookings.

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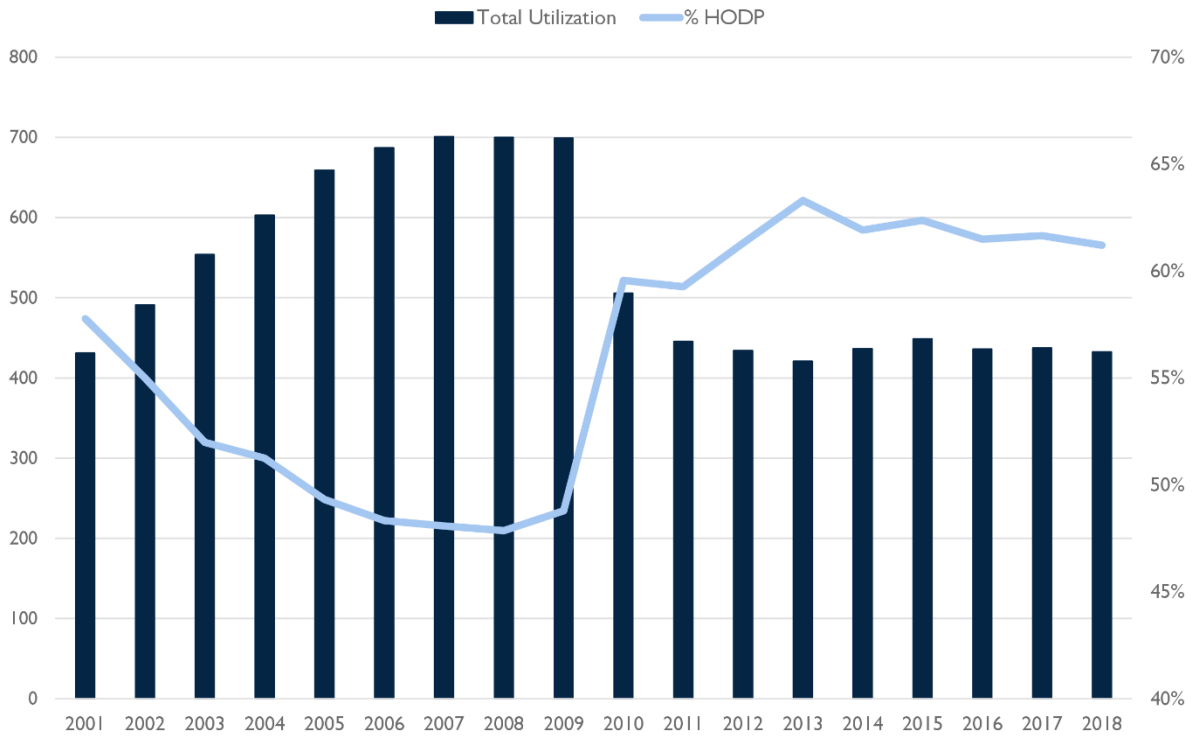
Executive Summary

Medicare's experience of paying for outpatient imaging services, particularly expensive advanced imaging such as MRIs, CAT scans, and nuclear scans, has been tumultuous over the last 20 years. The period was characterized by substantial increases in performance of advanced imaging services, mainly in doctors' offices, followed by a shift to hospital outpatient departments (HOPDs) and then a leveling off of utilization, as shown in the chart below. These trends were influenced by an extraordinary number of legislative and regulatory policy changes, most of which reduced payment amounts for services paid under the Physician Fee Schedule (PFS) in doctors' offices. This likely contributed to a movement of services to HOPDs, with payment based on the Outpatient Prospective Payment System (OPPS) where rates have been less impacted by policy changes. We termed this policy making process "dysfunctional" because there is no evidence that the results were anticipated or planned, despite the dramatic effect they have had on where advanced imaging is performed and at what cost. Moreover, we are not convinced that the current policy direction will result in a more coordinated and strategic approach.

ES Exhibit. Utilization for Advanced Imaging and Percentage of Imaging Done in HOPDs from 2001-2018



Source: CMS Physician/Supplier Summary File data compiled by Patel et al. for 2001 – 2013 and by the authors for 2010 – 2018

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Despite the recent leveling of the volume of advanced imaging per 1,000 Medicare beneficiaries, both the price and utilization are considerably higher in the US than in other developed countries. In addition, the fee schedule payment amounts have evolved over the study period such that the payments for the same high-volume services are consistently higher in the OPPS than in the PFS. This phenomenon contributes to the trend of hospital acquisition of physician practices, a development that undermines competition in the physician and hospital services markets.

We offer three recommendations for improving Medicare's treatment of advanced imaging in ambulatory settings, two of which focus on setting prices and one on managing utilization.

- First, CMS needs a more systematic method of establishing payment levels for services using expensive equipment involved in the performance of advanced imaging studies. Surveys conducted to obtain such data in the past have not been repeated and current data are lacking. While calls for better data are commonplace in critiques of Medicare payment, advanced imaging is one area where equipment is the dominant component of costs and changes rapidly as technology advances.
- Second, CMS should coordinate the process for setting payments under the PFS and OPPS. Historically, setting payments for advanced imaging that can be performed in either HOPDs or physician offices have been independent of one another, resulting in often widely diverging fees and shifts in site of care to take advantage of payment differences. Site neutrality should guide the process. Recognizing that hospitals will have higher overhead costs due to the need for 24/7 staffing for emergency patients and inpatient needs, a modest differential in rates would be justified, but we believe that it should not be as large as current differentials.
- Third, we believe that prior authorization, a system widely used by private insurers to control spending for advanced imaging and other expensive services, should be used to manage advanced imaging services paid under the PFS and OPPS. Prior authorization requires providers to seek permission to perform an advanced imaging study for the service to be covered, but it can be used selectively by excusing the requirement for those physicians with acceptable patterns of use. Medicare is instead embarking on a system called Appropriate Utilization Controls (AUCs), which relies on decision-support mechanisms but has not been used as a payment tool. While the law establishing the AUC program allows for prior authorization to be called upon in cases where clinicians are shown to be outliers in their ordering of advanced imaging, CMS has not provided information on how outliers will be identified and how prior authorization will be applied. We hope that CMS will draw on the vast experience of private insurers and elevate prior authorization from a secondary to a primary tool to manage advanced imaging if the AUC program proves to be unduly permissive.

Introduction

Medical imaging allows doctors and other health professionals to "see" various parts of the human body, enabling them to diagnose and treat patients' disease processes and structural problems. Over the past several decades, technological developments in advanced imaging— primarily in Magnetic Resonance Imaging (MRI), Computed Tomography (CT), and nuclear medicine studies— have added a degree of diagnostic precision that previously available technologies, such as X-rays, had been unable to achieve. There is no doubt that many patients have benefitted enormously from these technological advances, which allow doctors to adopt more focused and successful interventions to tackle patient illness and infirmity.

Despite these advantages, paying for advanced imaging has presented challenges for Medicare and other insurance programs. Advanced imaging studies are frequently expensive, and their introduction into mainstream medicine has been associated with rapid increases in Medicare spending. This is accompanied by concerns that not all spending on advanced imaging has led to better health outcomes for beneficiaries. Consequently, policy makers have adopted several measures designed to reduce both overly high prices and unnecessary utilization in order to bring spending under control. But these policy measures have not been coordinated and the program needs a more strategic approach.

In our view, policies affecting Medicare payment for advanced imaging during this century constitute a prime example of the "law of unintended consequences." As we explain later, reduced prices and increased regulatory requirements created incentives for physicians change the site of service, first from hospitals to physician offices, then back to hospital outpatient departments. These shifts were entirely predictable, even though there is no evidence in the record that they were an intended outcome of the policy making process. In addition, to the degree that the shift of advanced imaging back to hospitals involves employment by the hospital, this likely harms competition by steering more referrals to hospitals.

Below we provide background information on Medicare payment for imaging services in outpatient settings, followed by payment issues, trends, and factors that make imaging payment policy difficult. We continue with an enumeration of recent policies designed to control Medicare spending on imaging followed by our own recommendations and a brief conclusion.

Background

Traditional Medicare – the fee-for-service program that today provides payment for 63 percent of beneficiaries[1] – relies on multiple payment systems to compensate providers for Medicare-covered services. The systems of concern to this analysis are the Physician Fee Schedule (PFS) and the Hospital Outpatient Prospective Payment System (OPPS). Imaging is one area of medicine where identical services may be provided in doctors' offices or hospital outpatient departments. Payment rates are established and updated independently in the two systems; this frequently has led to widely different payment amounts for the same services.[2]

Policy analysts have debated whether payments for the same services should be the same, regardless of the site of service. The answer to the question is not obvious, but widely varying payments for the same services in different settings raises concerns that something is amiss in the ways that Medicare fees are set and risks both excessive Medicare spending and less competitive health care markets.

[1] "2020 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds" *Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds,* April 2020. https://www.cms.gov/files/document/2020-medicare-trustees-report.pdf

[2] Our analysis is not concerned with imaging services furnished in the inpatient setting because payments there are based on diagnosis rather than services provided. However, we include free-standing imaging centers because the physicians who practice there, mostly radiologists, are reimbursed under the PFS.

Payments for imaging are divided into two components. The Professional Component (PC) of an imaging service, which is the medical interpretation of the imaging test, is always paid for under the PFS, and at the same rate, regardless of where it is done. The Technical Component (TC), or the imaging itself, may be paid under either system, depending on where it is performed. Because most of the expense of advanced imaging tests comes from the TC, payment differences between the PFS and OPPS create provider financial incentives to prefer use of one site over the other. Moreover, changes in the relative TC payments appear to have shifted the site of care, first toward doctors' offices early in this century and then back to Hospital Outpatient Departments (HOPDs) subsequently Evidence presented later suggests that these shifts were a by-product, rather than an objective, of policy measures undertaken to control Medicare spending for advanced imaging services.

Long-standing government concern over imaging spending

Congressional support agencies have frequently been called on to investigate imaging spending during this century. For example, the Medicare Payment Advisory Commission (MedPAC), in a 2005 report, issued imaging-related policy recommendations including: adopting quality and safety standards for imaging equipment, editing procedure coding to detect imaging that should be bundled, and setting education and training standards for physicians billing for imaging services.[3] Additional recommendations were made by the Government Accountability Office (GAO) in five separate studies of Medicare imaging issues from 2008 through 2014.[4] As these studies were done at the request of Congress, this is indicative of congressional interest in imaging spending and utilization.[5]

Expensive procedures with unclear outcomes

The rapid expansion of imaging services occurred alongside rising questions about the clinical appropriateness of these procedures. According to MedPAC, there has been considerable regional variation in the use of imaging services, and studies have shown that the outcomes in the areas where there is higher imaging use aren't statistically better than those with less use of imaging.[6] GAO reported a rapid increase in Medicare spending for imaging in ambulatory settings accompanied by a pronounced shift in spending from HOPDs to physicians' offices from 2000 to 2006. In 2006 in-office imaging spending per beneficiary ranged from $62 in Vermont to $472 in Florida, an indicator of excess utilization in some parts of the country.[7] Because geographical variation in Medicare payment rates are small, most of the variation in spending is due to differences in utilization.

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[3] "Report To The Congress: Medicare Payment Policy," *The Medicare Payment Advisory Commission*, March 2005, http://www.medpac.gov/docs/default-source/reports/Mar05_EntireReport.pdf.

[4] "Medicare Part B Imaging Services: Rapid Spending Growth and Shift to Physician Offices Indicate Need for CMS to Consider Additional Management Practices (GAO-08-452)," *United States Government Accountability Office,* June 2008, https://www.gao.gov/new.items/d08452.pdf; "Medicare: Trends in Fees, Utilization, and Expenditures for Imaging Services before and after Implementation of the Deficit Reduction Act of 2005 (GAO-08-1102R)," *United States Government Accountability Office,* September 26, 2008, https://www.gao.gov/assets/100/95803.pdf; "Medicare: Higher Use of Advanced Imaging Services by Providers Who Self-Refer Costing Medicare Millions (GAO-12-966)," September 2012, https://www.gao.gov/assets/650/648988.pdf; "Medicare Imaging Accreditation: Establishing Minimum National Standards and an Oversight Framework Would Help Ensure Quality and Safety of Advanced Diagnostic Imaging Services (GAO-13-246)," *United States Government Accountability Office,* May 2013, https://www.gao.gov/assets/660/654971.pdf; "Medicare Imaging Accreditation: Effect on Access to Advanced Diagnostic Imaging is Unclear amid Other Policy Changes (GAO-14-378)," *United States Government Accountability Office,* April 2014, https://www.gao.gov/assets/670/662658.pdf. GAO also did studies in 1989, 1994, and 1995 focusing primarily on the consequences of self-referral for advanced imaging services.

[5] Part of congressional concern was to ensure that measures taken to reduce imaging spending did not diminish beneficiary access to imaging services.

[6] "Report To The Congress: Medicare Payment Policy," *The Medicare Payment Advisory Commission*, March 2005, http://www.medpac.gov/docs/default-source/reports/Mar05_EntireReport.pdf.

[7] "Medicare Part B Imaging Services: Rapid Spending Growth and Shift to Physician Offices Indicate Need for CMS to Consider Additional Management Practices," *United States Government Accountability Office*, June 2008, While some of this variation may have been due to differences across states in the extent of site of care shifts, in general the in-office trend mirrored the trend in imaging spending across all ambulatory settings, from $150 in Vermont to $684 in Florida in 2006. https://www.gao.gov/assets/280/276735.pdf.

In a comparison of imaging usage among hospitals, Mathias, et al. found sufficiently wide variations in usage to conclude that imaging was overused at some US hospitals.[8] More recently, Rosenkrantz, et al. found that, despite an overall decline in Medicare ambulatory imaging utilization from 2005 through 2012, variation across states actually increased over this period.[9]

Aside from the spending implications of excessive utilization, medical imaging procedures carry some risk. Exposure to radiation as well as potential reactions to any dyes used to provide contrast provide risk. Beyond this, there are the potential downstream risks of false positive or false negative diagnoses.

Changing Trends in Spending and Utilization

From the years 2000 through 2009, the cumulative growth in the volume of imaging, which comprises both the number and complexity of services, was 85 percent.[10] While advanced imaging utilization increased in both physician offices and HOPDs during this decade, it grew at a much faster rate in offices (83 percent growth from 2001 to 2008 vs a 26 percent growth in HOPDs).[11]

Overall utilization started to decline near the end of the decade, along with a shift from physician offices to HOPDs.[12] This continued from 2010 to 2018, as seen in Exhibit 1 below. Near the end of this period, the overall rate per 1000 beneficiaries flattened and the proportion performed in HOPDs stabilized at approximately 67 percent. Looking at the two decades together, we can see that the rapid growth in advanced imaging early in the century corresponded to a pronounced shift in site of service to doctors' offices, followed by a period of reduced utilization in the second decade accompanied by a pronounced shift back to HOPDs.

During interviews one of us conducted with physicians at the time, many cited a 2010 overhaul in the practice expense component of the Medicare Physician Fee Schedule to have been important for some specialties. As discussed later, another potential factor was that policy measures adopted in the first decade were much more stringent on payments under the physician fee schedule than the HOPD payment rates.

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[8] Jason S. Mathias, Joe Feinglass and David W. Baker, "Variation in US Hospital Performance on Imaging-use Measures" 50 MEDICAL CARE 505 (September 2012). https://pubmed.ncbi.nlm.nih.gov/22643196//

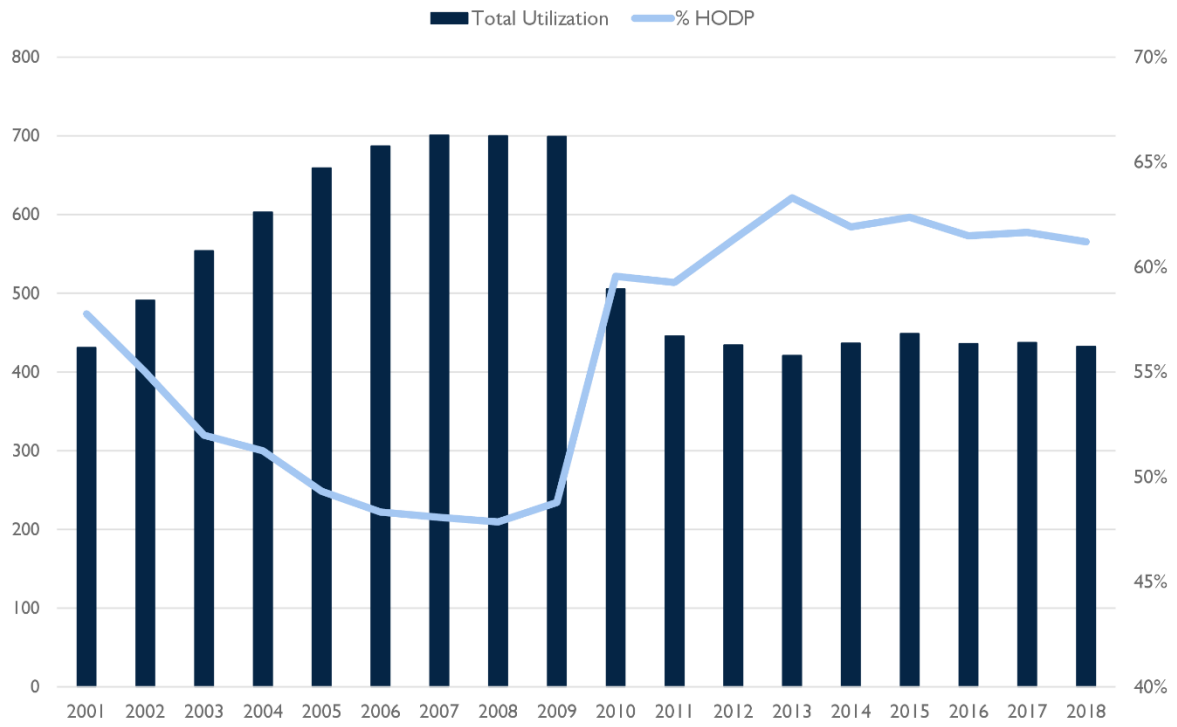
[9] Andrew B. Rosenkrantz, Danny R. Hughes and Richard Duszak, Jr. "State Variation in Medical Imaging: Despite Great Variation, the Medicare Spending Decline Continues" 205 AMERICAN JOURNAL OF ROENTGENOLOGY 817 (OCTOBER 2015). https://www.ajronline.org/doi/full/10.2214/AJR.15.14413.

[10] "Report to The Congress: Medicare Payment Policy," *The Medicare Payment Advisory Commission*, March 2013, http://medpac.gov/docs/default-source/reports/mar13_entirereport.pdf.

[11] Bhavik P. Patel, David C. Levin, Laurence Parker, Vijay M. Rao, "The Shift in Outpatient Advanced Imaging from Private Offices to Hospital Facilities," 12 JOURNAL OF THE AMERICAN COLLEGE OF RADIOLOGY 1042 (October 2015), https://www.jacr.org/article/S1546-1440(15)00392-0/fulltext.

[12] David C. Levin, Laurence Parker, Charles D. Palit, and Vijay M. Rao, "After Nearly A Decade of Rapid Growth, Use and Complexity of Imaging Declined, 2008-14," 36 HEALTH AFFAIRS 663 (April 2017), https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2016.0836; David W. Lee, Richard Duszak Jr., and Danny R. Hughes, "Comparative Analysis of Medicare Spending for Medical Imaging: Sustained Dramatic Slowdown Compared With Other Services," 201 AMERICAN JOURNAL OF ROENTGENOLOGY 1277 (December 2013), https://www.ajronline.org/doi/full/10.2214/AJR.13.10999; Bhavik P. Patel, David C. Levin, Laurence Parker, Vijay M. Rao, "The Shift in Outpatient Advanced Imaging From Private Offices to Hospital Facilities," 12 JOURNAL OF THE AMERICAN COLLEGE OF RADIOLOGY 1042 (October 2015), https://www.jacr.org/article/S1546-1440(15)00392-0/fulltext.

Exhibit 1. Utilization for Advanced Imaging and Percentage of Imaging Done in HOPDs from 2001-2018



Source: CMS Physician/Supplier Procedure Summary File, Patel et al.

Note: This graphic uses Centers for Medicare and Medicaid Services (CMS) data from 2001-13 reported in Patel et al. and the authors' calculations of CMS data from 2010-18. To reconcile the small differences in the overlapping years from 2010-2013, the authors report the average between Patel et al.'s data and our own calculations. For the years 2014-18, the authors adjusted their calculations to reflect the average difference between the Patel et al. data and our own calculations in the overlapping years.

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Looking at a few high-volume advanced imaging procedures from 2010 to 2018 reveals a combination of overall change in procedure frequency, which likely is at least partially technologically driven, and a secular shift in performance to HOPDs from non-hospital settings.[13] For example, as seen in Exhibit 2 below, the trend in CT scan of the thorax, without dye, shows increases in both settings and a modest shift toward hospital settings. The trend in MRI of the brain stem, with or without dye, shows very little overall change but a pronounced shift toward hospital settings. The trend in nuclear imaging of the heart muscle shows an overall decline in the procedure frequency and a pronounced shift to hospital settings.

[13] We chose these five advanced imaging procedures to show a mixture of procedure types that are conducted at high volumes – two CT scan procedures, two MRI procedures, and one nuclear medicine procedure. These are all procedures that might have diagnostic value in orthopedics, cardiology, and a range of other specialties that routinely use advanced imaging. Our selection of these procedures is not based on clinical value, but rather on volume."

Exhibit 2. Volume of Services and Proportion of Services in HOPDs in 2010 and 2018

Procedure	HCPCS Code	2010		2018		% Change in PFS to HOPD
		Total Volume	% HOPD	Total Volume	% HOPD	
CT thorax w/o dye	71250	837,000	64%	1,254,000	68%	6%
CT abd & pelv w/ contrast	74177	1,062,000	74%	1,262,000	74%	-0.1%
MRI brain stem w/o & w/ dye	70553	644,000	62%	662,000	69%	11%
MRI lumbar spine w/o dye	72148	971,000	47%	1,049,000	51%	7%
HT muscle image spect mult	78452	2,188,000	25%	1,487,000	44%	79%

Source: CMS Physician/Supplier Procedure Summary File

Note: 74177 did not exist in 2010, 2011 numbers used. HCPCS stands for Healthcare Common Procedure Coding System as defind by CMS.

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The rise in proportions of services performed in HOPDs coincided with changes in payment levels between the two years, as indicated in Exhibit 3. Global fees combine the technical and professional components and TC fees are for the technical component alone. While in 2010, some prices were higher in physician offices and some in HOPDs, by 2018 payments were all higher in the hospital setting - sometimes substantially so, as in the case of the nuclear imaging procedure. While Medicare's policies, discussed further in later sections, constrained payment in both sites, they also appear overall to have affected imaging in HOPDs much less substantially than in offices.

Exhibit 3. Payment for Select Advanced Imaging Procedures, 2010 and 2018

Procedure	HCPCS Code		2010		
			PFS	HOPD	% HOPD over PFS
CT Thorax w/o dye	71250	Global	$257.74	$255.16	-1%
		TC	$197.64	$195.06	-1%
CT abd & pelv w/ contrast	74177	Global	$340.10	$388.35	14%
		TC	$251.43	$299.67	19%
MRI brain stem w and w/o dye	70553	Global	$738.93	$656.71	-11%
		TC	$617.25	$535.03	-13%
MRI lumbar spine w/o dye	72148	Global	$468.65	$425.88	-9%
		TC	$391.96	$349.19	-11%
HT muscle image spect mult	78452	Global	$449.48	$854.71	90%
		TC	$369.10	$774.33	110%
Procedure	**HCPCS Code**		**2018**		
			2018 PFS	2018 HOPD	% HOPD over PFS
CT Thorax w/o dye	71250	Global	$165.96	$174.24	5%
		TC	$106.20	$114.48	8%
CT abd & pelv w/ contrast	74177	Global	$317.52	$346.32	9%
		TC	$223.92	$252.72	13%
MRI brain stem w and w/o dye	70553	Global	$385.56	$573.11	49%
		TC	$268.56	$456.11	70%
MRI lumbar spine w/o dye	72148	Global	$229.32	$308.88	35%
		TC	$153.00	$232.56	52%
HT muscle image spect mult	78452	Global	$500.39	$1,283.75	157%
		TC	$419.40	$1,202.75	187%

Source: CMS Physician/Supplier Procedure Summary File

Note: 74177 did not exist in 2010, 2011 numbers used. HCPCS stands for Healthcare Common Procedure Coding System as defind by CMS.

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Utilization and spending gaps compared to other developed countries

Both utilization and price of advanced imaging services are higher in the US than in other developed countries. For example, in 2016, the number of MRI studies per 1000 population exceeded the average for 11 developed countries by 44 percent[14] and the number of CT scans exceeded the average by 62 percent.[15] Payment level differences for these services were even more dramatic, with US levels frequently more than twice levels paid in many countries.[16] Other countries have nationalized health systems and use a variety of methods to control both utilization and prices. Japan, for example, regards

[14] Organisation for Economic Co-operation and Development, "Magnetic Resonance Imaging (MRI) Exams," https://data.oecd.org/healthcare/magnetic-resonance-imaging-mri-exams.htm#indicator-chart (last visited December 8, 2020).
[15] Organisation for Economic Co-operation and Development, "Computed Tomography (CT) Exams," https://data.oecd.org/healthcare/computed-tomography-ct-exams.htm#indicator-chart (last visited December 8, 2020).
[16] Irene Papanicolas, Liana R. Woskie, Ashish K. Jha, "Health Care Spending in the United States and Other High-Income Countries," 319 THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1024 (March 2018), https://jamanetwork.com/journals/jama/article-abstract/2674671?alert=article&alert=article&alert=article.

an exceptionally high rate of growth in a given procedure as indirect evidence that the payment for that procedure was set too high and lowers the payment rate in response.

Factors that Complicate Setting Imaging Payment Policy

While setting Medicare prices and managing utilization are never simple, doing so for advanced imaging procedures encounters several complicating issues.

Uncoordinated price-setting

The PFS and hospital OPPS payment systems have distinctly different origins – the PFS originally was based on physicians' historical fees and the OPPS was based on hospitals' historical costs. Both schedules have undergone numerous changes and updates over the years without explicit consideration of the differences in payment amounts for the technical components of the same imaging services paid under the two schedules.

For several decades the PFS has used a resource-based relative value scale (RBRVS) as the foundation for its payment rates for myriad services. In principle, differences in payment amounts under the PFS should reflect differences in resources, including physician time, required to perform a service as measured by the number of relative value units (RVUs) associated with each service paid under the fee schedule. RVUs are set and updated by CMS with substantial input from the Relative-Value Scale Update Committee. The TCs are set through the same process, but in advanced imaging, the TCs are very dependent on estimates of the direct expense of acquiring and operating the equipment required to perform imaging services.

The OPPS system groups services on the basis of Ambulatory Payment Classifications (APCs), which includes services related to the major reason for the visit to the OPD. Initially, the APC payment rates were based on aggregate spending for all HOPD services in 1998; that is, total spending under the OPPS was pegged to spending under the old cost-based payment system. Because the prior payments were based on hospital-specific incurred costs, the transition to APC payment involved large increases or decreases in aggregate payment for individual hospitals compared to what they were paid in 1998. Since then, APC rates have been based on aggregate hospital charges, adjusted to approximate aggregate hospital costs, and updated annually.[17]

Thus, the processes of setting OPPS and PFS payment amounts are completely independent of each other. So, for example, new information on the costs of imaging equipment might be incorporated into the PFS and OPPS years apart. A result is that differences in payment rates for an imaging procedure between the two schedules have varied substantially over time. But policy changes affecting the PFS more than the OPPS might have been even more important to differences in payment rates over time.

Technological change and equipment costs

There have been substantial advances in imaging technology beginning in the last century, especially in advanced imaging procedures. Principally driven by digital technology, these advances have produced more detailed images and greater efficiencies, as well as faster and more accurate interpretation and diagnosis.[18] Setting reimbursement rates is especially challenging in the case of the

[17] One reason why OPPS costs may have been high relative to the PFS pertains to the 16-year period between the implementation of the hospital Inpatient Prospective Payment System (IPPS) and the OPPS. During that period, when inpatient payments were divorced from individual hospitals' costs and outpatient payments were still cost-based, hospitals had an incentive to load as much of their overhead costs onto outpatient accounts as possible to maximize the sum of their IPPS and OPPS Medicare reimbursements. It is impossible to determine whether the legacy of this period still has an effect of increasing the base of OPPS payments relative to the PFS. In addition, some of the HOPD overhead may be traced to hospitals' broader social missions compared to doctors' offices.

[18] John Rego and KM Tan, "Advances in Imaging—The Changing Environment for the Imaging Specialist," 10 THE PERMANENTE JOURNAL 26 (Spring 2006), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3076980/pdf/i1552-5775-10-1-26.pdf, who express concern over an "arms race" among manufacturers of advanced imaging equipment.

technical components of advanced imaging studies, as it is difficult to estimate the unit costs of delivering these services.

A key factor in pricing the TCs in the physician fee schedule is assumptions made about the cost and efficient usage of the expensive equipment employed in advanced imaging studies. As with other digital products, it is likely that the costs of equipment purchase or lease fall over time, although newer models tend to have additional capabilities. CMS does not frequently update the cost of equipment. In addition to the cost and estimated life of the machines, estimates of capacity utilization, that is, the percent of time the machines are in use, are also important determinants of TC costs per unit and thus pricing. It is likely that the capacity utilization assumptions in the PFS were set too low early in the century, leading many physician practices to obtain the equipment and profit a great deal by using it a higher percentage of the time than pricing was based on. This practice also led to concerns about overutilization mentioned earlier and was the basis of several payment adjustments discussed in the next section.

Physician self-referral

Physician self-referral describes the scenario where physicians refer their patients to receive services in a facility in which they have a financial interest. Supporters of self-referral argue that this leads to earlier and more intensive testing, and thus better and more accurate treatment. However, self-referral can also create incentives for the physician to order excessive testing for their own benefit over that of their patients.[19] Higher levels of testing do not necessarily yield better results, especially if the testing is inappropriate. A 2010 study found, for example, that physician self-referral caused significantly and markedly higher costs per episode when expensive advanced imaging procedures where ordered, but not greater patient benefits compared to less expensive, non-advanced imaging. In its 2018 June Report, MedPAC found that the provision of advanced imaging includes a substantial amount of low-value, inappropriate care.[20]

Policy Measures

A number of measures have been taken over the last two decades to control spending for imaging, especially advanced imaging, in fee-for-service Medicare, as summarized in Exhibit 4. These measures are of two types – those that reduce Medicare's payment rates for certain services and those that seek to reduce service utilization. As spending is the product of price times quantity, both types of reduction result in lower spending. Notably, the policies might be designed to pertain to the PFS, the OPPS, or both.[21] That the policy process tends to work slowly is indicated by the fact that, despite the rapid climb in advanced imaging beginning early in the century, measures taken in response did not take effect until the second half of the first decade.

[19] Bruce J. Hillman and Jeff Goldsmith, "Imaging: The Self-Referral Boom and The Ongoing Search For Effective Policies To Contain It," 29 HEALTH AFFAIRS 2231 (December 2010), https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2010.1019.

[20] "Report to The Congress: Medicare Payment Policy," The Medicare Payment Advisory Commission, June 2018, http://medpac.gov/docs/default-source/reports/jun18_medpacreporttocongress_sec.pdf?sfvrsn=0.

[21] See Ferrari et al. for an analysis of the effects of policies on cardiology imaging payment through 2013. Victor A. Ferrari et al., "Cardiovascular Imaging Payment and Reimbursement Systems: Understanding the Past and Present in Order to Guide the Future," 7 JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY 324 (March 2014), https://www.sciencedirect.com/science/article/pii/S1936878X14000497?via%3Dihub.

Exhibit 4. Measures Taken to Manage Medicare Provision of and Spending for Advanced Imaging Services in the 21st Century

New Policy Measures	Implementation Date	Description	Fee Schedule Affected
Reducing Differences between PFS and OPPS Payment Rates	2007, 2015	Capped the TC of the PFS to that of the OPPS when payment in the former was higher; capped the OPPS to PFS rate for new, off-campus HOPD locations	PFS in 2007; OPPS in 2015
Multiple Procedure Adjustments	2006-2013	Cuts in PFS payments were applied when multiple imaging procedures were performed in the same patient session	Six separate reductions applied only to the PFS
Bundling Codes	2009-2011	Services that were often billed together under the PFS were put under one HCPCS code with one payment rate; Composite APCs were created for the OPPS	Two bundling episodes applied to the PFS; one episode of composite APCs in the OPPS
Recalculating Practice Expenses	2010-2013	Cuts in practice expense calculations reduced PFS RVUs and cost-to-charge ratios in the OPPS	Two reductions applied to the PFS in 2010 and 2013; one applied to the OPPS in 2014
Equipment Utilization	2010-2014	Progressive increases in the equipment utilization rate standard from 50 to 90 percent reduced TC payments in the PFS	Three separate reductions applied to the PFS
Mandatory accreditation program	2012	Required suppliers that produce the images for Medicare-covered advanced diagnostic services in office settings be accredited by an organization approved by CMS	Applied to the PFS
Appropriate Utilization Criteria (AUC) Program	2020	Starting in 2022, practitioners will be required to consult a Clinical Decision Support Mechanism (CDSM) before doing any advanced imaging or they won't receive payment	Applied to both PFS and OPPS

Note: Bundling codes reduced the number of advanced imaging procedures to a small degree.
Bundling and practice expense recalculatopns were applied to a wide range of services including advanced imaging.

Measures taken to reduce payment levels

Most of the policies implemented in this century to reduce spending for advanced imaging were price reductions in the physician fee schedule. The Deficit Reduction Act (DRA) of 2005, for example, limited PFS payments to the lesser of the existing payment amount in the PFS and OPPS systems. It was based on a judgment that PFS payments should not be higher than OPPS payments for the same services. According to GAO, the cap reduced Medicare fee schedule payments for about 65 percent of advanced imaging tests in 2007.[22] This measure demonstrates how the lack of coordination between payment in the two settings has the potential to lead to differences in payment that have the potential to exert undue influence on where services are provided. A decade later, the Bipartisan Budget Act of 2015, responding to the shift of physician practices and services to HOPDs, limited off-campus OPPS payments to the PFS payment for the same services, including advanced imaging.

Other price reductions were based on evidence regarding costs of providing services. Medicare uses an administered pricing system that attempts to set payments high enough to assure that providers will be willing to supply services to Medicare beneficiaries but not so high to result in excess spending and encourage unnecessary utilization. For example, there is evidence that when certain procedures are provided together, the cost to providers tends to be less than when the services are provided independently. This evidence led to several reductions in payment under the PFS, including reductions mandated in the Affordable Care Act of 2010.

Similarly, when codes for certain services that are routinely provided together occur on the same bill, Medicare has "bundled" two or more codes into a single code for the combined service and reduced payment to an amount below the previous sum of payments when the codes were billed separately.[23] Some of the measures affecting payment for advanced imaging were applied to a broader range of services, including bundling and recalculation of practice expenses, which reduced payment in both the PFS and OPPS.

Finally, assumptions made about the rate of utilization of expensive imaging equipment have had an important effect on PFS payment rates. The assumed rate was set initially at 50 percent of practice operation time (presumably regular business hours), increased to 75 percent near the end of the 2000s, and eventually raised to 90 percent in American Taxpayer Relief Act of 2014. These increases were at least in part supported by a survey conducted by the American Medical Association and one by the National Opinion Research Center (NORC) under contract to MedPAC.[24] Raising the equipment utilization rate reduced PFS technical component payments because equipment costs were allocated across more cases, and average costs therefore reduced.

Measures taken to manage utilization[25]

While most of the policy measures reported here focus on payment rates, which also indirectly influences utilization rates, some directly address utilization and quality, such as the accreditation requirement initiated in 2012 by the Medicare Improvements for Patients and Providers Act of 2008 (MIPPA). While this measure was motivated by quality concerns, it has the potential to reduce utilization if not all suppliers can meet the accreditation standards.

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[22] The United States Government Accountability Office, Letter to Senators John D. Rockefeller IV and Gordon H. Smith regarding Medicare: Trends in Fees, Utilization, and Expenditures for Imaging Services before and after Implementation of the Deficit Reduction Act of 2005, September 26, 2008, https://www.gao.gov/assets/100/95803.pdf.

[23] Stempniak (2020) reports that reducing payment for multiple procedures in a single setting and bundling procedures have substantially reduced Medicare imaging reimbursements.

[24] "Report to The Congress: Medicare and the Health Care Delivery System" *The Medicare Payment Advisory Commission*, June 2020, http://www.medpac.gov/docs/default-source/reports/jun20_reporttocongress_sec.pdf

[25] Prior to this century, and therefore out of scope for this analysis, limits placed on self-referral of patients for services that the referring physician or a family member has a financial interest in, were imposed through legislation. Work done by GAO suggests that self-referral is still a source of excess utilization.

Congress required GAO to evaluate the implementation of the accreditation program and its effect on beneficiary access to imaging services.[26] GAO observed that the number of beneficiaries receiving advanced imaging services declined both before and after the implementation of the accreditation program. GAO concluded that other forces were at work affecting imaging utilization in doctors' offices and expressed doubt that accreditation by itself had much effect.[27]

More recently, a section of the Patient Access to Medicare Act of 2014, requires providers to use clinical decision support mechanisms (CDSMs) based on Appropriate Utilization Controls (AUCs) when they order advanced imaging studies. Providers who conduct and bill for the imaging study must include information on the appropriateness obtained from their CDSM contractors on their PFS and OPPS Medicare claims.[28] The law also requires CMS to identify outliers -- providers who appear to be excessively high utilizers of advanced imaging, and to use prior authorization to limit such excesses. Providers are required to adopt AUCs, but payments will not be adversely affected by non-compliance until January 1, 2022.[29]

Lack of coordination between the PFS and OPPS schedules

Looking across all the provisions, it appears that they have had a greater effect on in-office than hospital outpatient services. Also, physicians may be more responsive to changes in payment rates for services in their offices, which have large direct impacts on them, than to payment rates for the hospitals where they practice. Thus, the shift of services to hospitals was not surprising. Note that "changing the site of service" involves hospitals acquiring physician practices and the physicians becoming hospital employees—a major step that is difficult to reverse.

The movement of advanced imaging away from doctors' offices to the HOPD, combined with the increase in payments there compared to the PFS, likely have increased Medicare spending for advanced imaging and additional shifts will increase spending further, even if overall volume doesn't increase. Higher payment rates in the OPPS has made hospital acquisition of physician practices more attractive because higher compensation for physicians than in private practice is possible. Additional hospital employment of physicians makes the physician services market more consolidated, which means that employed physicians are no longer considering at least the cost elements of the best location for their patients to get imaging services. It also makes hospital markets more difficult for new competitors to enter.[30] In fact, a 2018 AMA survey showed that for the first time, employed physicians outnumbered independent physicians, with an increase in hospital-employed physicians and a decrease in office-employed physicians.[31]

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[26] The accreditation program, which was designed to promote the quality and appropriateness of advanced imaging, was applicable to physicians' offices and freestanding diagnostic testing facilities but not hospital outpatient facilities.
[27] "Medicare Imaging Accreditation: Establishing Minimum National Standards and an Oversight Framework Would Help Ensure Quality and Safety of Advanced Diagnostic Imaging Services," *United States Government Accountability Office*, May 2013, https://www.gao.gov/assets/660/654971.pdf; "Medicare Imaging Accreditation: Effect on Access to Advanced Diagnostic Imaging Is Unclear amid Other Policy Changes," *United States Government Accountability Office*, April 2014, https://www.gao.gov/assets/670/662658.pdf.
[28] "Report to The Congress: Medicare and the Health Care Delivery System" *The Medicare Payment Advisory Commission*, June 2018, http://medpac.gov/docs/default-source/reports/jun18_medpacreporttocongress_sec.pdf?sfvrsn=0
[29] Centers for Medicaid and Medicare Services, "Appropriate Use Criteria Program," last updated August 12, 2020, https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Appropriate-Use-Criteria-Program.
[30] "Increasing Hospital Physician Consolidation Highlights Need for Payment Reform," *United States Government Accountability Office*, December 2015, https://www.gao.gov/assets/680/674347.pdf.
[31] "In 2018, More Physicians Were Employed Than Independent, AMA Finds," *Advisory Board*, May 9, 2019, https://www.advisory.com/daily-briefing/2019/05/09/private-practice. One potential offsetting advantage of the movement to the HOPD is there may be less opportunity for physician self-referral in that setting compared to physician offices.

Recommendations

Provider financial incentives in the Medicare program are both normal and can be desirable. We want providers to have incentives to furnish services to beneficiaries so that access to services, which historically has been excellent in the Medicare program, is maintained. But the concern is that for services that are less invasive and not painful to patients, incentives to furnish them might be too strong and lead to substantial overuse. The challenge is to create policies ensuring that the nature and scope of services are in line with beneficiaries' clinical needs, and that payment amounts do not exceed levels necessary to assure appropriate access. Not overpaying includes both setting appropriate payment amounts and providing services in the most appropriate site of care.

The characteristics of advanced imaging, especially the substantial revenues associated with performance of advanced imaging studies, which can be done in a variety of settings, make it difficult to meet this challenge. Policies already adopted to control imaging spending have had a greater impact on payment under the PFS than the OPPS, accounting in part for the shift to hospitals where payment rates, on average, are substantially higher.[32] It seems clear that new policies should pertain to all ambulatory settings where advanced imaging studies are performed.

We have three recommendations for improving Medicare's treatment of advanced imaging to accomplish the goals specified above. The first two concern approaches to setting more accurate—and thus efficient--payment rates; the third concerns methods to ensure appropriate utilization.

First, CMS needs a more systematic method of establishing payment levels for advanced imaging that includes data-driven standards for the use of expensive equipment involved in the performance of imaging studies. Needed data include the cost, expected lifetime, and required staffing of imaging equipment. Such data would also be essential to establish standards for the percentage of time the equipment should be in use or available for use. Surveys conducted in the past have not been systematically repeated, and, the cost of conducting periodic surveys would be minimal compared to the benefits of having more accurate and current data. Such surveys could be used to collect data to support setting payments for other services, such as tests.

Second, CMS should coordinate the process for setting and updating payment rates for advanced imaging TCs in the PFS and OPPS. A simple approach would be a policy of site neutrality that would mandate the same payment level for the same service, regardless of site of care. A more refined approach, which we favor, would recognize that hospitals tend to have higher overhead costs for imaging due to the need to operate the facilities on a 24/7 basis to serve the needs of emergency department patients and inpatients. This would justify somewhat higher rates for hospital outpatient departments, based mostly on additional technician labor. But that does not mean that the site differences should be as large as some of the differentials are today. The extra costs of operating around the clock can be estimated with relevant data and this can be incorporated into the process for setting rates for HOPD in relation to rates in the PFS.[33]

Third, we believe that prior authorization should play a major, rather than a secondary, role in managing advanced imaging in Medicare. CMS's current strategy will rely on the Appropriate Use Criteria program. The program, which was mandated by Congress, will apply to imaging in both the physician office and hospital outpatient settings and will eventually use some form of prior

[32] Brady Post, Edward C. Norton, Brent Hollenbeck, Thomas Buchmueller, and Andrew M. Ryan, Hospital-Physician Integration and Medicare's Site-Based Outpatient Payments, HEALTH SERVICES RESEARCH, vol 56, issue 1, p. 7-15, January 27, 2021. Post et al. (2021) report that Medicare reimbursements to physicians for a wide range of services are substantially higher for physician practices that are integrated with hospitals than for practices that are independent of hospitals. Some private payers are channeling patients to freestanding imaging centers and doctors' offices to avoid higher insurance payments in hospital outpatient facilities. Modern Healthcare A.M. October 8, 2020.

[33] This policy could certainly apply to many more types of services than advanced imaging in the PFS and HOPD payment systems.

authorization to regulate advanced imaging by "outlier ordering professionals." The regulations allowed for a one-year education and training period before payments would be affected in 2021, but CMS decided that another training year would be required before payments are affected in 2022. While AUCs have reportedly been utilized by professional societies for educational purposes, to the best of our knowledge they have not been used to limit payments for imaging services in outpatient settings.[34]

We believe that Medicare should be tapping into the extensive experience in administering prior authorization programs that Medicare Advantage plans, Medicaid plans, and commercial insurance plans have. Insurers have been using this strategy for decades and believe it limits unnecessary utilization and encourages providers to adhere to accepted practice guidelines.[35] It is made more efficient by excusing from the requirement those physicians with acceptable patterns of past use. While traditionally not a part of the Medicare program, prior authorization has recently been used in Medicare, in a demonstration of payment for durable medical equipment, such as power wheelchairs. In a congressionally mandated study, GAO concluded that prior authorization had achieved substantial savings and recommended that CMS continue the program and look for other opportunities to use prior authorization to control excess utilization.[36]

While the law calls for using prior authorization for providers who are shown to be outliers in their ordering of advanced imaging, CMS has not provided any information on how outliers will be identified and how prior authorization will be applied. In fact, CMS has indicated that it will need to collect data in calendar years 2022 and 2023 to make these determinations. Consequently, not only has implementation of the program been delayed, but the use of potentially effective management tools delayed even further.

Our concern about reliance on the AUC program to manage utilization of advanced imaging in Medicare is related to the differing incentives associated with prior authorization (PA) and AUC, as depicted in Exhibit 5 below. In the private sector, for example, insurers, on behalf of their customers (often employers), conduct PA or hire contractors, such as Radiology Benefit Managers (RBMs), to do so. The resulting limits on excess utilization is consistent with their customers' concerns for limiting premium increases and out of pocket spending.

In contrast, under AUC, providers select the decision support entities whose decisions determine "appropriate utilization" of advanced imaging within the provider's practice. Their actions may limit excessive utilization (benefitting Medicare and its beneficiaries to a degree), but, in this case, providers are the customers, and they have little interest in controlling spending for advanced imaging. Therefore, we would expect the AUC program to be considerably less constraining than PA in managing advanced imaging utilization.

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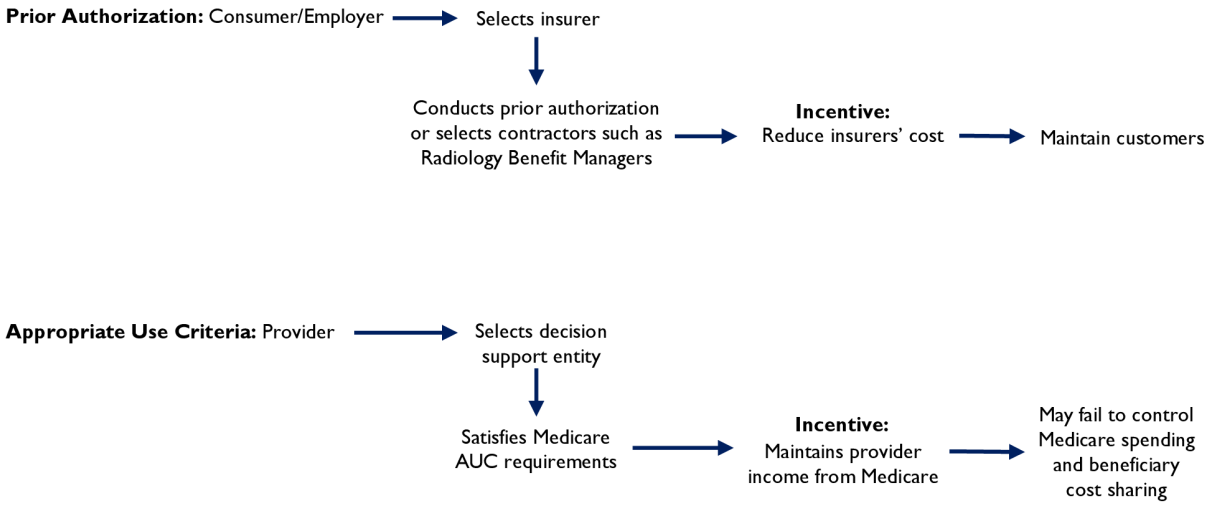
[34] Victor A. Ferrari et al., "Cardiovascular Imaging Payment and Reimbursement Systems: Understanding the Past and Present in Order to Guide the Future," 7 JACC: CARDIOVASCULAR IMAGING 324 (March 2014), https://www.sciencedirect.com/science/article/pii/S1936878X14000497?via%3Dihub.

[35] "Medicare Part B Imaging Services: Rapid Spending Growth and Shift to Physician Offices Indicate Need for CMS to Consider Additional Management Practices," *United States Government Accountability Office*, June 2008, https://www.gao.gov/assets/280/276735.pdf.

[36] "CMS Should Take Actions to Continue Prior Authorization Efforts to Reduce Spending," *United States Government Accountability Office*, April 2018, https://www.gao.gov/assets/700/691381.pdf.

Exhibit 5. Prior Authorization and Appropriate Use Criteria Incentives



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Thus, it is unclear to us how the AUC program will moderate utilization of advanced imaging in physician offices and HOPDs. Nevertheless, it is beneficial that the program was created to apply to all ambulatory settings and that prior authorization was named in law as a tool to be employed for controlling excess utilization. We hope that CMS will take its lessons on how to apply prior authorization from its own experience with durable medical equipment and with the experience of payers who are currently using it in private insurance programs. If the AUC program proves to be unduly permissive, we would advise policymakers to elevate prior authorization from a secondary to a primary tool to manage advanced imaging utilization in Medicare.

Conclusion

The first two decades of the 21st century have been a tumultuous time for Medicare imaging policy. We have seen substantial shifts in site of service from hospitals to doctors' offices—coinciding with sharp increases in utilization--then back to hospital outpatient departments, associated with changes in payment amounts under the physician and hospital outpatient fee schedules. The uncoordinated approach to payment policy has likely influenced this trend without specific objectives concerning where advanced imaging services should be performed and how much they should cost.

As we enter the third decade of this century, we see that Medicare has substantially higher utilization and reimbursement rates for advanced imaging than European countries, the principal fee schedules that pay for outpatient imaging services remain uncoordinated, and the data necessary to set payment rates at efficient levels are lacking. Moreover, Medicare is embarking on reliance on an untested program to manage imaging utilization while effective methods widely used in the private sector lie waiting in the wings.

Surely, we can do better. As policy makers seek to transform Medicare from a volume-based to a value-based program, they will need to address the kinds of issues we have raised here to ensure that payment rates are based on accurate data and utilization controls are fair to both providers and beneficiaries.

The USC-Brookings Schaeffer Initiative for Health Policy is a partnership between the Economic Studies Program at Brookings and the USC Schaeffer Center for Health Policy & Economics and aims to inform the national health care debate with rigorous, evidence-based analysis leading to practical recommendations using the collaborative strengths of USC and Brookings.

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