Professional Efficiencies for Diagnostic Imaging Services Rendered by Different Physicians: Analysis of Recent Medicare Multiple Procedure Payment Reduction Policy

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Purpose: The aim of this study was to quantify potential physician work efficiencies and appropriate multiple procedure payment reductions for different same-session diagnostic imaging studies interpreted by different physicians in the same group practice.

Methods: Medicare Resource-Based Relative Value Scale data were analyzed to determine the relative contributions of various preservice, intraservice, and postservice physician diagnostic imaging work activities. An expert panel quantified potential duplications in professional work activities when separate examinations were performed during the same session by different physicians within the same group practice. Maximum potential work duplications for various imaging modalities were calculated and compared with those used as the basis of CMS payment policy.

Results: No potential intraservice work duplication was identified when different examination interpretations were rendered by different physicians in the same group practice. When multiple interpretations within the same modality were rendered by different physicians, maximum potential duplicated preservice and postservice activities ranged from 5% (radiography, fluoroscopy, and nuclear medicine) to 13.6% (CT). Maximum mean potential duplicated work relative value units ranged from 0.0049 (radiography and fluoroscopy) to 0.0413 (CT). This equates to overall potential total work reductions ranging from 1.39% (nuclear medicine) to 2.73% (CT). Across all modalities, this corresponds to maximum Medicare professional component physician fee reductions of 1.23 ± 0.38% (range, 0.95%-1.87%) for services within the same modality, much less than an order of magnitude smaller than those implemented by CMS. For services from different modalities, potential duplications were too small to quantify.

Conclusions: Although potential efficiencies exist in physician preservice and postservice work when same-session, same-modality imaging services are rendered by different physicians in the same group practice, these are relatively minuscule and have been grossly overestimated by current CMS payment policy. Greater transparency and methodologic rigor in government payment policy development are warranted.

Key Words: Professional component, relative value unit, RVU, multiple procedure payment reduction, MPPR, physician work, efficiencies, radiology, medical imaging, Centers for Medicare and Medicaid Services, payment policy


With health care spending growing at a pace many consider unsustainable, CMS and other payers have implemented—and continue to expand—ongoing health care cost reduction and payment accuracy initiatives. Although prior rapid growth in the utilization of medical imaging has reversed [1] and associated Medicare spend-
ing is now below 2006 levels [2], some still consider medical imaging to be overvalued. As such, ongoing policy initiatives continue to disproportionately target this health care sector [3].

In response to a previous US Government Accountability Office report [4] and subsequent recommendations to Congress by the Medicare Payment Advisory Commission [5], CMS initiated a program in 2012 to reduce professional payment to physicians providing multiple imaging services to the same patient in the same session [6]. Although a prior study demonstrated professional efficiencies on the order of only 3% to 5% [7], CMS implemented a multiple procedure payment reduction (MPPR) policy that reduced payments by 25% for second and subsequent same-session services rendered by the same physician.

Despite objections from imaging stakeholders, CMS more recently expanded the MPPR policy to now apply to different physicians in the same group practice rendering different imaging services to a patient during the same session [8]. So, for example, if a neuroradiologist interpreted a brain MRI examination on a patient with headache and nausea, and, shortly thereafter, an abdominal imager interpreted an abdominal ultrasound study on the same patient for the same indication, the latter physician’s payment would be reduced on the basis of assumed efficiencies.

Our methodology reflects an iteration of the methodology previously used to study potential professional work efficiencies when separate imaging examinations on the same patient are rendered by different physicians in the same group practice, we convened an expert panel to conduct a detailed analysis using Resource-Based Relative Value Scale (RBRVS) files for representative services of various imaging modalities.

**METHODS**

Our methodology reflects an iteration of the methodology previously used to study potential professional work efficiencies when separate imaging examinations on the same patient are rendered by different physicians in the same group practice, an analysis that was based on methodology earlier outlined by the Government Accountability Office [4]. The same source data files were used for this study, and the same expert panel was convened.

Relevant RBRVS data from the commercially available RBRVS Data Manager [9] were critically reviewed, focusing on rigorously defined elements of physician work for individual services. Physician work has been specifically divided into that performed before the actual service (preservice work), that involved in performing the service itself (intraservice work), and that performed after the intraservice work (postservice work) [10]. The following have been designated as components of professional work for various imaging services: protocoling an examination (preservice work), interpretation and dictation (intraservice work), and communicating findings with a referring physician (postservice work).

By historic convention, preservice and postservice physician time are valued at 0.0224 relative value units (RVUs) per minute [11]. Intraservice physician time does not have defined RVUs per minute but varies depending on the intensity of the particular service. Intensity is determined by differences in a service’s necessary technical skill, physical effort, mental effort and judgment, and psychological stress of patient risk or injury. Referred to as the intensity of work per unit time, the intraservice RVUs per minute are almost always higher than the RVUs per minute of preservice and postservice work [10]. These weightings, already assigned for individual services, were used in our calculations.

RBRVS time data were used to determine relative contributions of preservice, intraservice, and postservice time to total time involved in rendering common diagnostic imaging services. As with our prior analysis, we used only those services with assigned preservice, intraservice, and postservice times [7]. We once again excluded imaging guidance, therapeutic, and radiologic supervision and interpretation codes (as these were all designed to be reported in conjunction with other codes), as well as add-on codes, which, by definition, reflect minimal (if any) preservice and postservice work. Previously selected commonly performed representative services within various modalities were analyzed. These are outlined in Table 1; they consist of 21 diagnostic radiography and fluoroscopy (RF) Current Procedural Terminology® codes, 32 CT codes, 13 nuclear medicine (NM) codes, 36 ultrasound codes, and 34 MRI codes. To permit valid comparison with our prior work, we did not include codes created after 2011 in this analysis.

An expert panel of 5 radiologists was reconvened to review activities typically performed during preservice, intraservice, and postservice periods for each code-defined service to determine which physician activities could potentially be duplicated when different imaging examinations were performed on individual patients by different members of the same group practice during the same session of service. Because of provider community confusion regarding the ambiguous definition of a “session” by CMS, we used official guidance from the ACR’s interpretation in our deliberations [12]. A modified Delphi process was used.

Members of the expert panel are all familiar with the RBRVS process and serve or previously served as voting members of the AMA/Specialty Society Relative Value Scale Update Committee (RUC) (B.A., G.M., and W.D.D.) or as formal specialty society advisors to the RUC (B.A., G.M., E.S., W.D.D., and R.M.B.). It should be noted that our previous analysis focused on only preservice and postservice work because there was
Table 1. Current Procedural Terminology codes selected for analysis, by modality

<table>
<thead>
<tr>
<th>Modality</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>71010, 71020, 73080, 73100, 73110, 73120, 73130, 73140, 73160, 73630, 74000, 74020, 74022, 74251, 77055, 77056, 77057, 77076, 77080, 77081, and 77082</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>76510, 76511, 76512, 76514, 76519, 76536, 76700, 76776, 76801, 76805, 76811, 76813, 76815, 76816, 76817, 76818, 76819, 76820, 76821, 76825, 76830, 76831, 76873, 76871, 76882, 93306, 93307, 93312, 93350, 93351, 93380, 93382, 93893, 93922, 93923, and 93924</td>
</tr>
<tr>
<td>NM</td>
<td>78306, 78315, 78451, 78452, 78453, 78454, 78802, 78811, 78812, 78813, 78814, 78815, and 78816</td>
</tr>
<tr>
<td>CT</td>
<td>70496, 70498, 71250, 71260, 71275, 72125, 72128, 72131, 72191, 72192, 72193, 73200, 73206, 73700, 73706, 74150, 74160, 74175, 74176, 74177, 74178, 74216, 74262, 74263, 75571, 75572, 75573, 75574, 75635, 76376, 78377, and 77079</td>
</tr>
<tr>
<td>MRI</td>
<td>70542, 70543, 70544, 70545, 70546, 70547, 70548, 70549, 70551, 70554, 70555, 70557, 71552, 71555, 72159, 72196, 72197, 72198, 72319, 72320, 73222, 73223, 73225, 73719, 73720, 73722, 73723, 73725, 74182, 74183, 74185, 75557, 75559, 75561, and 75563</td>
</tr>
</tbody>
</table>

Note: NM = nuclear medicine; RF = radiography and fluoroscopy.

We determined the percentage contribution of potential reduced work to the total professional-component (PC) RVUs and excluded practice expense and malpractice RVUs from the calculation because these components should not be affected by the MPPR. We additionally calculated the maximum potential percentage of duplicated total PC work, as previously detailed [7]. An example of this analytic methodology for a code pair in the CT family is illustrated in Table 2.

RESULTS

In its review of a number of clinical scenarios, the panel deemed overlap of intraservice work by 2 different physicians (eg, noncontrast CT of the head by a neuroradiologist with concurrent contrast-enhanced CT of the abdomen and pelvis by an abdominal imager on a patient with headache and nausea) to be so negligible or nonexistent that duplication calculations were not possible. As such, all potential work duplication was attributed entirely to preservice and postservice activities.

Modality-specific potential work and RVU duplication is detailed in Table 3, along with a calculated effect on PC work value for second and subsequent services and the effect on the total PC work value.

The maximum percentage of total potentially duplicated preservice and postservice activity varied almost 3-fold among modalities, ranging from 5% for RF and NM to 13.6% for CT. Mean service maximum potential duplicated work RVUs similarly varied by modality, ranging from 0.0049 for RF to 0.0413 for CT.

The maximum estimated percentage work reduction when second and subsequent separate services were rendered by different physicians in the same group practice ranged from 1.39% for NM to 2.73% for CT (mean, 1.81 ± 0.55%). In contrast to the single systematic 25% reduction implemented by CMS, our code-specific expert panel analysis resulted in calculations of maximum total PC fee reductions for second and subsequent different physician services ranging from 0.95% for NM to

unanimous panel consensus at the time of study design that no quantifiable intraservice work efficiencies existed. Because CMS has since asserted intraservice work efficiencies in scenarios in which different imaging services are provided by different physicians [8], we expanded our present analysis to specifically address intraservice work. The panel first considered potential duplications in intraservice work to determine whether prior calculation methodology was appropriate (ie, if there remains consensus that no such efficiencies exist) or should be modified.

A table of typical physician work activities previously created from RBRVS Data Manager file descriptions of physician work for 5 imaging modalities (RF, ultrasound, NM, CT, and MRI) was used as the basis for our service period analysis [7]. Given large variations in intraservice work activities between modalities, identifying uniform activities across all modalities was not possible. As such, a decision was made that if intraservice work efficiencies were identifiable, all intraservice work components for each modality would be addressed in toto as a single activity for that modality. After determining average activity times for each modality, the panel estimated the proportionate time allocated to each individual activity and the percentage of maximum potential duplication for each activity when services are performed by different physician group members for all service periods for which potential efficiencies could be identified. We generally considered any activity performed once (eg, obtaining informed consent) to have 100% potential duplication, any activity that required some additional work (eg, discussing findings with the referring physician) to have 50% potential duplication, and any activity that was largely unique to each service (eg, reviewing relevant prior images) to have 5% potential duplication. In addition, the panel considered the likelihood that such duplications would apply when different physicians were involved in the provision of different services. These estimates allowed a calculation of maximum potential duplication of time for each modality.
1.87% for CT, with a mean of 1.23 ± 0.38% across all imaging modalities.

The calculations above apply only to services within the same modality (e.g., CT of the head and chest, rather than CT of the head and ultrasound of the abdomen). In its review of a number of clinical scenarios in which examinations from different modalities were rendered by different physicians, the panel identified considerably less overlap of preservice and postservice work than when services of the same modality were rendered. This overlap was deemed so negligible that duplication calculations could not be performed.

**DISCUSSION**

CMS has a long history of applying MPPR policy to select Current Procedural Terminology codes when the agency believes services furnished together result in efficiencies in work or other resources. By long-standing convention since the introduction of the RBRVS, for example, Medicare has reduced payments by 50% for the second and subsequent surgical procedures furnished to the same patient on the same day by a single physician (or physicians in the same group practice). Such discounting is based on relatively wide acknowledgment, as part of the RUC process, of duplication of practice expenses associated with the provision of presurgical and postsurgical physician work. For surgical codes, which often have 10-day or 90-day global periods, the vast majority of those efficiencies are attributable to a reduction in the nonprocedural evaluation and management services that are included in that global period.

The expansion of MPPR outside of the surgical realm and into PC payments for diagnostic imaging is a much more recent phenomenon. In 1995, MPPR policy was extended to a finite group of NM diagnostic procedures with a 50% reduction in the technical component (TC) of Medicare payment (i.e., not the professional interpretive component) [8]. Imaging-focused MPPR policy was then static for more than a decade, until TC-only MPPR discounts were applied at a 25% level in 2006 to a number of other diagnostic imaging services, beginning with 11 code families and then extending across all advanced imaging modalities. In 2010, the Patient Protection and Affordable Care Act increased that TC MPPR to 50% [8].

A more recent history of the MPPR as it applies to diagnostic imaging has already been outlined in the introduction section. Repeated individual physician and professional society objections to MPPR methodology and expansion have not, however, resulted in national policy change or greater clarity as to the methodology used for policymaking. The 25% discounting of PC imaging services rendered by the same physician on the same day that was implemented in 2012 remains in place. Since the beginning of 2013, this same 25% discount has applied to PC imaging services rendered by different physicians in the same group practice, the focus...
of this analysis. And CMS has suggested that MPPR policy may be further expanded to (1) the TCs of all imaging services, (2) the PCs of all imaging services, and (3) the TCs of all diagnostic tests [8].

Although diagnostic radiology has been particularly visible among Medicare specialties targeted by recent CMS MPPR initiatives, medical imaging has not been alone in this policy expansion. In 2011, physical therapy TC services became subject to 20% or 25% MPPR discounting, depending on whether they were rendered in institutional settings or locations where the Medicare Physician Fee Schedule applies [8]. And earlier this year, CMS expanded the MPPR to TC payments for 121 different cardiovascular service codes (at 25%) and 27 different ophthalmologic service codes (at 20%) [8]. Should the agency consider this further expansion of the MPPR precedent, the implications for many primary care and specialty providers in future years could be profound.

As with diagnostic imaging, the methodology used by CMS to determine fee-reduction policy affecting various ancillary services provided across multiple specialties is unclear. How did CMS arrive at round 20%, 25%, and 50% reductions in making these determinations? Even within modalities, large standard deviations from the mean exist, with high coefficients of variation [7]. These indicate considerable variability in work activities and associated potential efficiencies, between one modality and another. To that end, we believe that an ongoing “one size fits all” cross-modality imaging MPPR is overly simplistic and clinically unrealistic. The appropriateness of applying an identical across-the-board 25% reduction to services rendered by different physicians, when efficiencies are shown here to be considerably much less, is particularly unclear and merits further clarification.

Our expert panel specifically focused on potential duplications in intraservice work as part of this analysis and concluded that no measurable efficiencies exist for intraservice work. This conclusion is concordant with our prior report [7] as well as long-standing precedent in the surgical MPPR, which recognizes efficiencies only in preservice and postservice work, not intraservice work. Both our findings and surgical MPPR precedent directly counter the assertion by CMS that there are “some efficiencies in the intraservice period” for imaging [8].

In its defense of MPPR expansion and intraservice work efficiencies, the agency has stated that it believes that efficiencies exist in the parts of the service that deal directly with patients, such as gowning and obtaining consent, as well as in the interpretation, where the first completed interpretation is commonly available to the second interpreting physician at the point of interpretation. [8]

How the “efficiencies” of patient gowning and obtaining consent apply to typical diagnostic radiology professional services is unclear because the former is not a professional service and the latter almost never applies to noninvasive diagnostic imaging. The expert panel was also unable to quantify purported efficiencies due to the availability of prior interpretations given (1) that different physician services usually pertain to separate and distinct body parts (for which such a report, if existent, would rarely have relevance) and (2) that other same-session interpretations, by definition, are not available when physician services are rendered concurrently or in immediate sequence. Additionally, the review of prior studies and records, when performed, has long been considered and valued as a component of physician work in the RBRVS process; identification of any further efficiency beyond that which has already been valued in the RUC process has not been explained in the rule-making process.

It also seems that the agency’s rationale for applying the MPPR for services rendered by different physicians may have as much to do with preventing potential fraud and abuse as it does with addressing efficiencies, as CMS states: [8]

We believe application of the imaging MPPR to physicians in the same group practice will ensure that there is no financial incentive for physicians in a group practice to change their behavior to split imaging interpretation services for a beneficiary among different physicians in the group. [8]

Although the potential for such behavior theoretically exists, we are unaware of documented cases where this

Table 3. Results of aggregate analysis

<table>
<thead>
<tr>
<th></th>
<th>RF</th>
<th>Ultrasound</th>
<th>NM</th>
<th>CT</th>
<th>MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum potential duplication of all preservice and postservice work activities*</td>
<td>5%</td>
<td>5.6%</td>
<td>5%</td>
<td>13.6%</td>
<td>7%</td>
</tr>
<tr>
<td>Maximum potential duplicate work (RVUs)</td>
<td>0.0049</td>
<td>0.0182</td>
<td>0.0222</td>
<td>0.0413</td>
<td>0.0289</td>
</tr>
<tr>
<td>Maximum percentage work reduction when separate imaging services are performed by a different physician in same group</td>
<td>1.53%</td>
<td>1.88%</td>
<td>1.39%</td>
<td>2.73%</td>
<td>1.51%</td>
</tr>
<tr>
<td>Maximum total PC fee reduction when separate imaging services are performed by different physicians in same group</td>
<td>1.04%</td>
<td>1.26%</td>
<td>0.95%</td>
<td>1.87%</td>
<td>1.02%</td>
</tr>
</tbody>
</table>

Note: NM = nuclear medicine; PC = professional component; RF = radiography and fluoroscopy; RVU = relative value unit.

*Because different physician potential intraservice work duplication was deemed so negligible as to be not measurable, only potential duplication of preservice and postservice work is reported. Values in subsequent rows consider these potential reductions as a portion of total work RVUs.
potential has been translated into practice. Furthermore, the implementation of prospective payment reductions to all providers seems inappropriate in comparison with the many targeted provider-focused remedies the government has typically pursued when fraud and abuse are suspected.

Compared with services performed by the same physician, we found that calculated potential preservice and postservice work duplications are considerably less when services were rendered by different physicians. Although efficiencies occasionally occur, for example, when a single radiologist interpreting 2 studies makes a single phone call to a referring physician, such efficiencies clearly cannot exist when 2 or more separate radiologists perform separate and distinct professional services, sometimes from entirely different locations. Although documentation of the historical rationale behind the long-standing and well-accepted surgical discounting policy is incomplete, we believe that comparison with surgical services is instructive. Unlike surgical MPPR policy, for which efficiencies may indeed exist when one surgeon rounds on a patient operated on by both himself and a colleague, in the typical practice of radiology, physicians are each separately responsible for the nonoverlapping preservice and postservice work associated with a particular study (e.g., separate review of different old studies for different body part interpretations). For surgical services, service period activities other than those related to evaluation and management are overall too trivial and variable to justify payment reductions and thus have not been considered as a basis for MPPR policy.

Our previous study focusing on efficiencies when same-session services are rendered by the same physician showed very small potential duplications of work: more than an order of magnitude less than those reflected in the originally proposed 50% MPPR and later finalized at 25% [7]. We found a similarly substantial discrepancy in this study as well—again, of greater than an order of magnitude—when MPPR was applied to services rendered by different physicians. This discordance remains difficult to explain. Should it be forthcoming, CMS policy making transparency would be extremely helpful to us and future investigators in reconciling our conclusions with those of the agency.

Confounding our analysis, and also the application of the MPPR from a practical sense, is the lack of clear guidance by CMS as to what constitutes an imaging session. Although 2 services performed in immediate succession for the same clinical condition (such as a CT scan of the brain and cervical spine in the setting of trauma) would quite clearly be considered part of the same patient session, other situations are much less clear. If a patient presents to an emergency department with abdominal pain and undergoes ultrasound, for example, and returns 12 hours later and then undergoes CT of the abdomen and pelvis, would that constitute the same session? If so, the agency seems to have established a precedent for future discounting payment to the second treating emergency physician. Agency responses to such varied nuanced— but clinically not uncommon— questions have not clarified this issue. For the purposes of our analysis, we thus heeded conservative professional society advice [12] regarding the application of the term “same session.” It should be noted that in response to professional societies seeking terminology clarification, CMS has intimated that it may extend the MPPR to any services on the same day, whether related or not [8]. We believe that working with stakeholders actively involved in providing these services to seek clinically meaningful consensus on what defines a session would be far preferable to arbitrarily defining a session as a calendar day.

Other limitations exist in an analysis such as this. The RBRVS Data Manager was not specifically designed for such a study, but because this served as the basis of the original Government Accountability Office report [4] that catalyzed recent CMS MPPR policy development, we again elected to use the same commercially available data source to attempt to reproduce the government’s results. Second, given the difficulty in rigorously quantifying actual efficiencies, we elected to focus on maximum plausible potential efficiencies. This approach is concordant with our prior published experience in this domain but does potentially overestimate actual efficiencies in many practices. Furthermore, any potential efficiencies may already be factored in to the RUC valuation process, which includes careful consideration of the global period and the activities included therein for any procedure code at the time of valuation. Finally, the use of an expert consensus panel as the basis for duplication estimation admittedly creates the potential for some variability in results determination. To that end, we strived to convene a panel consisting of recognized experts in physician work valuation who, very importantly, are all board-certified diagnostic radiologists and are all currently actively engaged in the practice of radiology. Although another similarly qualified expert panel might produce slightly different results, the high degree of panelist concordance achieved during consensus development leads us to believe that another equally qualified panel would reach similar conclusions.

**TAKE-HOME POINTS**

- Although potential efficiencies exist when same-session separate imaging services are rendered by different physicians in the same group practice, these are minuscule and attributable only to preservice and postservice work within specific modalities.
- In contrast to the single systematic 25% professional payment reduction implemented by CMS, our expert panel’s code-specific analysis supports MPPR discounts averaging only 1.23% when subsequent differ-
ent services are rendered by different physicians in the same group.

- Greater CMS methodologic rigor, transparency, and accountability in Medicare payment policy development are warranted.

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