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# Impact of Resource-Based Practice Expenses on the Medicare Physician Volume

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*In 1999, Medicare implemented a resource-based relative value unit (RVU) system for physician practice expense payments, and increased the number of services for which practice expense payments differ by site. Using 1998-2004 data, we examined RVU growth and decomposed that growth into resource-based RVUs, site of service, and service quantity and mix. We found that the number services with site of service differentials doubled, and that shifts in site of service and introduction of resource-based practice expenses (RBPE) were important sources of change in practice expense RVU volume. Service quantity and mix remained the largest source of growth in total RVU volume.*

## INTRODUCTION

In 1992, Medicare implemented the Medicare physician fee schedule (MPFS) using a resource-based relative value scale (RBRVS), which established physician service payments based on relative costs instead of prevailing charges. The goal of the MPFS was to correct distortions produced by charge-based payments and to encourage medical practice efficiencies (Physician Payment Review Commission, 1989). Under the new system, payments are based on the number of RVUs assigned to each service. Total RVUs reflect three

cost components: (1) physician work (or time and effort), (2) practice expenses, and (3) professional liability insurance for a given service. Costs associated with each component are given a weight, or index value, and are adjusted to account for area price differences. The three index values for a service are then summed and multiplied by a standard dollar amount (a conversion factor) to arrive at a payment amount. On average, work represents 52 percent of total physician payments, practice expenses represent 44 percent, and liability insurance represents 4 percent (U.S. General Accounting Office, 2005). Overall, Medicare physician payments totaled over \$40 billion in 2003, or almost 17 percent of Medicare spending (Centers for Medicare & Medicaid Services, 2006a). Medicare payments represent roughly 20 percent of revenues to physicians, although the share varies by specialty (Smith et al., 2006).

While resource-based work RVUs were the foundation of the MPFS, practice expense and liability insurance RVUs continued to be based on historical charges until 1999 and 2000, respectively, when resource-based values for these components were phased in (*Federal Register*, 1998a,b). By 2002, most of the system's relative values were derived from estimates of resources, however the program made substantial refinements to the RBPE values between 2002 and 2004 (*Federal Register*, 2002; 2003).<sup>1</sup> Like the original

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<sup>1</sup> Most imaging RVUs are charge-based. They will be resource-based in 2010, the year that the transition to practice expense RVUs using the bottom-up resource estimation method is slated to be complete.

RBRVS created for physician work, the shift to RBPE and liability insurance values was intended to better align payments with resource costs, and was expected to redistribute payments toward evaluative-oriented services.

One aspect of the new practice expense payment system is that CMS substantially increased the number of services for which the practice expense payment is affected by the site of service, and changed the level of the site of service differential for services that already had a differential. In essence, these changes regarding site of service differentials were designed to more accurately compensate physicians when they furnish procedures in their offices versus in other ambulatory settings. For a service with a site of service differential, facility practice expense RVUs are applied when that service is furnished in a setting whose facility costs are reimbursed under other Medicare payment systems (such as hospital outpatient departments or ambulatory surgical centers) (*Federal Register*, 2002). Non-facility practice expense RVUs (which are higher in value than the facility RVUs) are applied when a service is furnished in a setting where no other Medicare payment system covers the facility-related expenses. By far the most common non-facility setting, in terms of service quantity and Medicare spending, is the physician office.<sup>2</sup> Until 1999, facility practice expense RVUs were calculated simply by applying a 50-percent reduction to a service's non-facility practice expense RVU value (*Federal Register*, 2002). However, when developing the RBPE RVUs, average practice expenses were estimated in both the facility and non-facility settings, for the services that Medicare determined would have a site of service differential.

<sup>2</sup> Non-facility practice expense RVUs also apply to rural health clinics, independent diagnostic testing centers, and nursing homes (physician services furnished to beneficiaries in non-skilled nursing home stays).

Advances in clinical care, anesthesia methods, and medical technologies have allowed many elective procedures that used to be furnished in the hospital inpatient setting to be furnished in ambulatory settings, and it is estimated that at least 60 to 70 percent of all surgeries are done on an ambulatory basis (Owings and Kozak, 1998). The shift toward furnishing services in hospital outpatient departments and ambulatory surgical centers has been occurring for over 20 years, while the trend to furnish some procedures in the office setting is more recent (Pasternak, 2004). Recognizing the trend toward performing more procedures, and more complex procedures, in the office setting, in 1999 the American Society of Anesthesiologists (2004) developed formal guidelines for office-based anesthesia, and over 24 States have considered legislation, regulation, or guidelines in the area (Sutton, 2002). Across the elderly and non-elderly population, the office setting accounts for estimates ranging from 5 (Pasternak, 2004) to 10 percent (American Society of Anesthesiologists, 2001) of all surgeries, with common procedures in the office setting ranging from, for example, relatively simple biopsies to hernia repairs to knee arthroscopies (American Society of Anesthesiologists, 2001).

Our focus is in identifying the additional services with site of service payment differentials and seeing whether changes occurred in setting choice and in RVU volume during the period that site of service differentials were added and that RBPE RVUs were implemented. While the current literature includes assessments of the impact of the new practice expense RVU system (Maxwell, Zuckerman, and Aliaga, 2005; U.S. General Accounting Office, 2001; *Federal Register*, 1998b), we are not aware of studies that have examined both aspects of the new system—RBPE and

expansion of the site of service differential policy—across services. Moreover, if the new payment system results in some shift of services into non-facility settings, then it could be contributing to the growth in Medicare physician expenditures and the size of the conversion factor reductions resulting under the sustainable growth rate (SGR) policy.

In this study, we identified: (1) changes in the site of physician services furnished between 1998 and 2004, (2) the types of services in which site of service differentials now apply, and (3) the level of the site of service differentials per service. We then analyzed aggregate growth in Medicare physician practice expense and total RVU volume (the latter being a counterpart to Medicare spending on physician services) and the sources of that growth in terms of: (1) shifts in site of service, (2) changes due to shifting from charge-based to RBPE RVUs, and (3) changes in the quantity and mix of services furnished.

## **DATA**

We developed data on utilization of Medicare physician services in 1998-2004 from CMS annual summaries of physician/supplier claims files. We obtained annual RVU files for 1998-2004 from CMS. RVU files list the work, practice expense, and liability insurance relative values for each service code paid under the Medicare fee schedule. Using the annual RVUs and claims, we calculated practice expense RVUs and total RVUs for each service code paid under the Medicare fee schedule. To permit our decomposition analyses, we restricted our attention to services utilized in both 1998 and 2004. In any given year, new codes introduced in that year represent less than 1 percent of Medicare physician payments in that year (Medicare Payment Advisory Commission, 2004).

## **METHODS**

### **Computing RVU Volume**

An RVU is the unit of measure for Medicare's RBRVS and each service is assigned a different number of RVUs according to its relative resource costs. Since payment rates are determined by multiplying RVUs by a single conversion factor, total RVUs are analogous to relative payment rates. In this study, we used RVUs to compute an intensity-weighted measure of service quantity, called RVU volume (Physician Payment Review Commission, 1996; Glass and Anderson, 2002; McCormack and Burge, 1994; Conoley and Vernon, 1991). Thus, RVU volume in a given year is the sum, across services, of the number of units of each service multiplied by the RVU value assigned to that service in that year. We computed both practice expense and total RVU volume (which includes work, practice expenses, and liability insurance RVUs) as well as their aggregate change between 1998 and 2004.

### **Isolating Sources of Change in RVU Volume**

We then decomposed the change in practice expense and total RVU volume over the 6 years into three factors: (1) changes due to site of service, (2) changes due to the implementation and refinement of RBPE RVU values, and (3) changes in the quantity and mix of services furnished over the period. In essence, we isolated and quantified each of these components of change by alternately holding constant the other two factors over the study period. First, we identified volume change due to shifts in site of service using the following calculation, summed across all services:

Equation 1 (Site of Service Component):

$$\sum_{i=1}^N \sum_{k=1}^2 w_{04}^{ik} Q_{04}^{ik} RVU_{04}^{ik} - \sum_{i=1}^N \sum_{k=1}^2 w_{98}^{ik} Q_{04}^{ik} RVU_{04}^{ik}$$

where  $i$  denotes services (1,...,N),  $k$  site of service (facility or non-facility)  $Q_{04}^{ik}$  is the quantity of service  $i$  provided in site of service  $k$  in 2004;  $RVU_{04}^{ik}$  is the 2004 RVU for each service  $i$  in site of service  $k$ , and  $w_t^{ik}$  is the share of service  $i$  provided in site of service  $k$  in year  $t$  ( $t= 1998$  or  $2004$ ). We define this share as:

$$w_t^{ik} = \frac{Q_t^{ik}}{\sum_{k=1}^2 Q_t^{ik}}$$

Thus, the change in RVU volume resulting from Equation 1 quantifies the change in RVU volume due purely to shifts in site of service between 1998 and 2004.

Second, we identified RVU volume change due to the shift from charge-based to RBPE RVUs using the following calculation:

Equation 2 (Resource-Based RVU Component):

$$\sum_{i=1}^N \sum_{k=1}^2 w_{98}^{ik} Q_{04}^{ik} RVU_{04}^{ik} - \sum_{i=1}^N \sum_{k=1}^2 w_{98}^{ik} Q_{04}^{ik} RVU_{98}^{ik}$$

where all terms are defined as in Equation 1; and  $RVU_{98}^{ik}$  is the RVU that applies to service  $i$  in site of service  $k$  in 1998. The change in RVU volume resulting from Equation 2 quantifies the change in RVU volume due to the shift from charge-based to RBPE RVUs.

Third, we identified residual RVU volume change, due to changes in the mix and quantity of services furnished over the 6-year period, using the following calculation:

Equation 3 (Service Mix and Quantity Component):

$$\sum_{i=1}^N \sum_{k=1}^2 w_{98}^{ik} Q_{04}^{ik} RVU_{98}^{ik} - \sum_{i=1}^N \sum_{k=1}^2 w_{98}^{ik} Q_{98}^{ik} RVU_{98}^{ik}$$

where all terms are as previously defined; and  $Q_{98}^{ik}$  is the quantity of service  $i$  in site

of service  $k$  in 1998. Thus, the change in RVU volume resulting from Equation 3 quantifies a residual change in RVU volume, due to changes in the mix and quantity of services furnished over the period. Service mix and quantity is a unified concept used by policymakers and researchers when analyzing changes in physician service volume (Dummit, 2006; Medicare Payment Advisory Commission, 2005; Mitchell, 1992; Zuckerman and Holahan, 1992; Barer, Evans, and Labelle, 1988).

### Grouping Services into Clinical Categories

To present the study results, we grouped services using the Berenson-Eggers type of service (BETOS) system (Berenson and Holahan, 1992; Centers for Medicare & Medicaid Services, 2006c), which assigns service codes to 1 of 104 clinically meaningful categories. We first present the data according to five BETOS summary groups: (1) evaluation and management services, (2) major procedures, (3) other procedures, (4) imaging services, and (5) tests. Major procedures include coronary artery bypass grafts and hip and knee replacement surgeries. Other procedures include cataract extractions, colonoscopies and other endoscopic procedures, and routine dermatology procedures. We also present results at a more detailed BETOS level. We retain the imaging services category in our results for completeness, however only a small number of services in the imaging category (mainly services conducted in preparation for X-rays) are paid in the same manner as other services on the MPFS and are potentially affected in the same manner by the facility/non-facility shifts isolated in Equation 1. Payment for the vast majority of imaging services are split into technical and

**Table 1**  
**Physician Services Furnished in the Non-Facility Setting, by Type of Service: 1998 and 2004**

Type of Service	1998		2004		Change in the Non-Facility Share (Percent)
	Total Quantity of Services Furnished (Millions)	Furnished in Non-Facility Setting (Percent)	Total Quantity of Services Furnished (Millions)	Furnished in Non-Facility Setting (Percent)	
Total	697.8	57.2	952.9	61.5	7.5
Evaluation and Management Visits	407.3	61.0	503.2	61.9	1.5
Office/Outpatient	186.5	96.0	229.4	95.1	-0.9
Hospital	94.1	1.8	114.7	2.2	17.4
Emergency Room	14.5	0.0	18.9	0.0	18.6
Home	1.3	99.8	2.0	99.6	-0.3
Nursing Home	20.9	32.5	23.4	44.9	38.3
Specialty	65.8	76.8	82.4	77.9	1.5
Consultations	24.3	38.3	32.3	44.2	15.5
Major Procedures	9.2	2.4	12.0	3.9	63.6
Cardiovascular	4.4	1.6	5.6	4.2	155.0
Orthopedic	1.4	4.5	2.2	3.1	-32.0
Other	3.4	2.5	4.2	4.0	63.1
Other Procedures	97.8	79.7	175.0	85.7	7.5
Eye Procedures	4.0	38.4	4.8	40.9	6.5
Ambulatory	22.8	82.6	34.2	84.7	2.4
Minor	50.9	91.4	110.1	95.8	4.8
Onocology	11.0	80.9	14.3	78.5	-3.0
Endoscopy	7.5	28.6	9.6	24.4	-14.6
Dialysis Services	1.6	1.5	2.0	2.2	44.8
Imaging	118.4	31.0	162.5	36.5	17.6
Standard	74.8	32.1	90.7	37.8	17.8
Advanced	12.5	17.4	25.2	23.8	36.3
Echography	24.4	41.8	38.0	48.1	15.0
Imaging/Procedures	6.7	4.7	8.6	8.2	75.3
Tests	65.1	55.0	100.2	64.4	17.1
Laboratory	4.4	40.2	9.9	47.6	18.3
Other	60.7	56.0	90.3	66.2	18.2

NOTE: Non-facility hospital and nursing home visits refer to services not paid under hospital prospective payment system (PPS) rates or under skilled nursing facility PPS rates (e.g., individuals receiving Medicare-covered physician services in residential nursing home stays).

SOURCE: Maxwell, S. and Zuckerman, S., The Urban Institute: Analysis of 1998 and 2004 Medicare Physician/Supplier Claims Files and Relative Value Unit Files.

professional components,<sup>3</sup> and changes in the growth and mix of those components are captured in Equation 3.

## RESULTS

Table 1 shows the share of services furnished in non-facility (namely physician office) settings in 1998 and 2004, by type of service. Varying levels of shift toward the non-facility setting is seen across the

five service categories. The very small shift among evaluation and management services (from 61 to almost 62 percent) is driven mainly by an increase in pathology services (located in the specialty visit group) and consultations occurring in the non-facility setting. Among major procedures, a broad range of minimally invasive cardiovascular major procedures and other major procedures shifted toward the non-facility setting, causing a shift from 2.4 to 3.9 percent. In the other procedures category, the increase in the share of non-facility services (from 79.7 to 85.7 percent) was driven by fairly small

<sup>3</sup> A professional component is paid to the provider interpreting an imaging service and a technical component is paid to the provider conducting the imaging service. A provider receives both components if it conducts and interprets the service.

shifts across several procedures, including eye procedures and some ambulatory and minor procedures. The increasing share of imaging procedures and tests in non-facility settings occurred across a broad range of services.

To identify the type of services affected by Medicare's application of a site of service practice expense payment differential in 1998 versus 2004 (and currently), we examined the number of services used in both 1998 and 2004 that have site of service differentials (Table 2). In many cases this table confirms the findings from Table 1, in that many of the types of codes with

newly added site of service differentials are consistent with the types of services that exhibited some shift in quantity toward the non-facility setting. In 1998, 600 services were used in which site of service differentials applied, compared with 1,444 in 2004. Among evaluation and management services, in 1998 site of service differentials applied to mainly office/outpatient and ophthalmology visits (located in the specialty visits group). After 1998, site of service differentials were added to four additional types of visits—(1) psychiatry, (2) pathology, (3) nursing home, and (4) critical care (data

**Table 2**  
**Physician Service Codes with Practice Expense Site-of-Service Differentials, by Type of Service: 1998 and 2004**

Type of Service	Codes with Site-of-Service Differentials			
	Codes Used in 1998 (Number)	Codes Used in 2004 (Number)	Increase Between 1998-2004	
			Number	Percent
Total	600	1,444	844	58
Evaluation and Management Visits	67	129	62	48
Office/Outpatient	12	14	2	14
Hospital	0	3	3	100
Emergency Room	0	0	0	
Home	0	0	0	
Nursing Home	0	8	8	100
Specialty-Specific Consultations	46	94	48	51
	9	10	1	10
Major Procedures	28	144	116	81
Cardiovascular	0	6	6	100
Orthopedic	22	89	67	75
Other	6	49	43	88
Other Procedures	493	1115	622	56
Eye	26	74	48	65
Ambulatory	100	398	298	75
Minor	331	535	204	38
Oncology	5	6	1	17
Endoscopy	31	102	71	70
Dialysis Services	0	0	0	
Imaging	1	30	29	97
Standard	1	20	19	95
Advanced	0	0	0	
Echography	0	2	2	100
Imaging/Procedures	0	8	8	100
Tests	6	18	12	67
Laboratory	0	6	6	100
Other	6	12	6	50

NOTE: Non-facility hospital and nursing home visits refer to services not paid under hospital prospective payment system (PPS) rates or under skilled nursing facility PPS rates (e.g., individuals receiving Medicare-covered physician services in residential nursing home stays).

SOURCE: Maxwell, S. and Zuckerman, S., The Urban Institute: Analysis of 1998 and 2004 Medicare Physician/Supplier Claims Files and Relative Value Unit Files.

not shown). Among major procedures, site of service differentials were added to several orthopedic procedures, and to a range of other services including prostate procedures, skin grafts, and various types of biopsies (data not shown). As Table 2 shows, several hundred types of other procedures gained site of service differentials, including services in the eye, ambulatory, minor, and endoscopy categories—493 codes used in 1998 had differentials, compared to 1,115 in 2004. Examples of the codes in the other procedures category in which site of service differentials were added include colonoscopies, upper gastrointestinal endoscopies, skin graft and wound procedures, and several types of fracture and tendon repairs. As noted, X-rays and most other imaging services do not have site of service differentials. However as Table 2 indicates, site of service differentials were added to several codes grouped in this category, most of which describe injections and other preparations for X-rays.

In analyzing the data in Tables 1 and 2, we found that growth in service frequency in the non-facility setting and in the applicable practice expense RVUs are more highly correlated among the codes with newly-designated differentials than among codes that had site of service differentials in 1998. This occurred, in part, because the PE RVU values applied to the non-facility setting increased more, on average, among the newly designated services than among services that had previous differentials. This also occurred because the numbers of services furnished in the non-facility setting were much higher among those codes that already had site of service differentials, which results in a much smaller rate of service growth. Services that exhibited particularly large growth in both

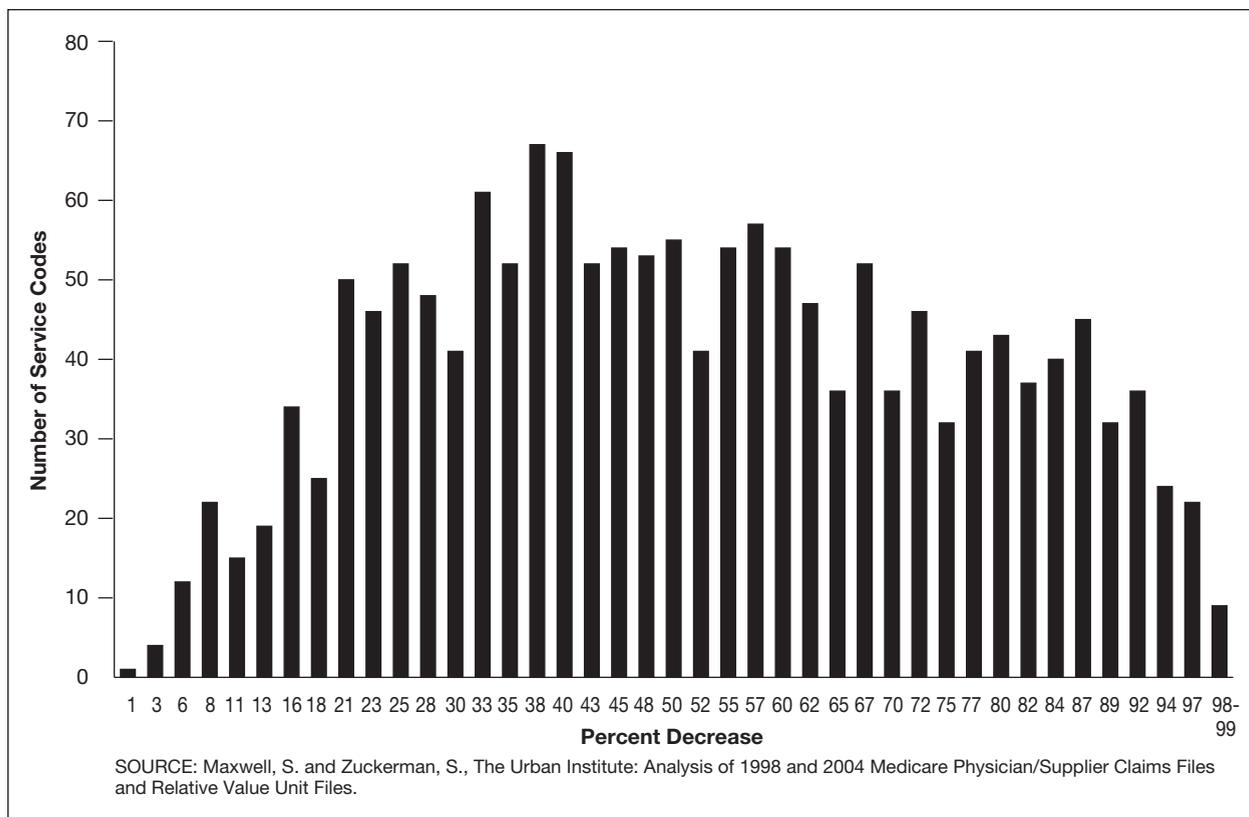
non-facility service frequency and their PE RVUs included a range of codes related to injections for X-rays, wound management, minor orthopedic procedures such as strapping, and some eye, endoscopic, and prostate procedures (data not shown, but available on request from the authors).

Figure 1 illustrates the variation in site of service differentials between non-facility and facility PE RVUs per service in 2004, and the number of codes with a given level of differential. Under the RBPE payment system, the variation in the differentials, calculated here as the percent decrease from the non-facility to facility value, span the entire range from a 1- to a 99-percent difference. The average non-facility-to-facility differential, among services with a non-zero differential, is 51 percent.

Figure 2 illustrates our decomposition analysis of change in practice expense RVU volume between 1998 and 2004, by type of service. Across all services, changes in the site of service (and the corresponding application of a site of service differential)—controlling for all other changes in implementing RBPE RVUs and for changes in service quantity and mix—resulted in an increase of 66.7 million practice expense RVUs.<sup>4</sup> All other changes due to implementing RBPE RVU values resulted in an increase of 83.8 million PE RVUs. The importance of the factors varies across service types, for example resource-based RVUs is the largest source of volume growth for evaluation and management, while resource-based RVUs and changes in site of service are comparable sources of volume growth for the other procedures category. For major procedures and imaging, volume growth due to changes in site of service offset some of the volume

<sup>4</sup> RVU volume grew despite budget neutrality adjustments because PE RVUs were not adjusted to maintain budget neutrality. Budget neutrality was imposed via cuts in the conversion factor.

**Figure 1**  
**Percentage Difference Between Non-Facility and Facility Practice Expense Relative Value Unit Assignments: 2004**



losses attributable to the shift to resource-based PE RVUs. Figure 2 also illustrates that changes in service quantity and mix are substantial drivers of volume. This factor serves essentially as a control variable in the PE RVU analysis, and our discussion of it is reserved for the decomposition analysis of total RVU volume, which provides a more comprehensive context for examining the factor.

Table 3 shows the results of the decomposition of PE RVUs using detailed BETOS categories. While most of the increase in PE RVU volume among evaluation and management services was due to implementation of resource-based PE RVUs, changes in site of service resulted in some increase in practice expense volume among mainly office/outpatient and specialty visits, and nursing home visits. Site of service changes among nursing

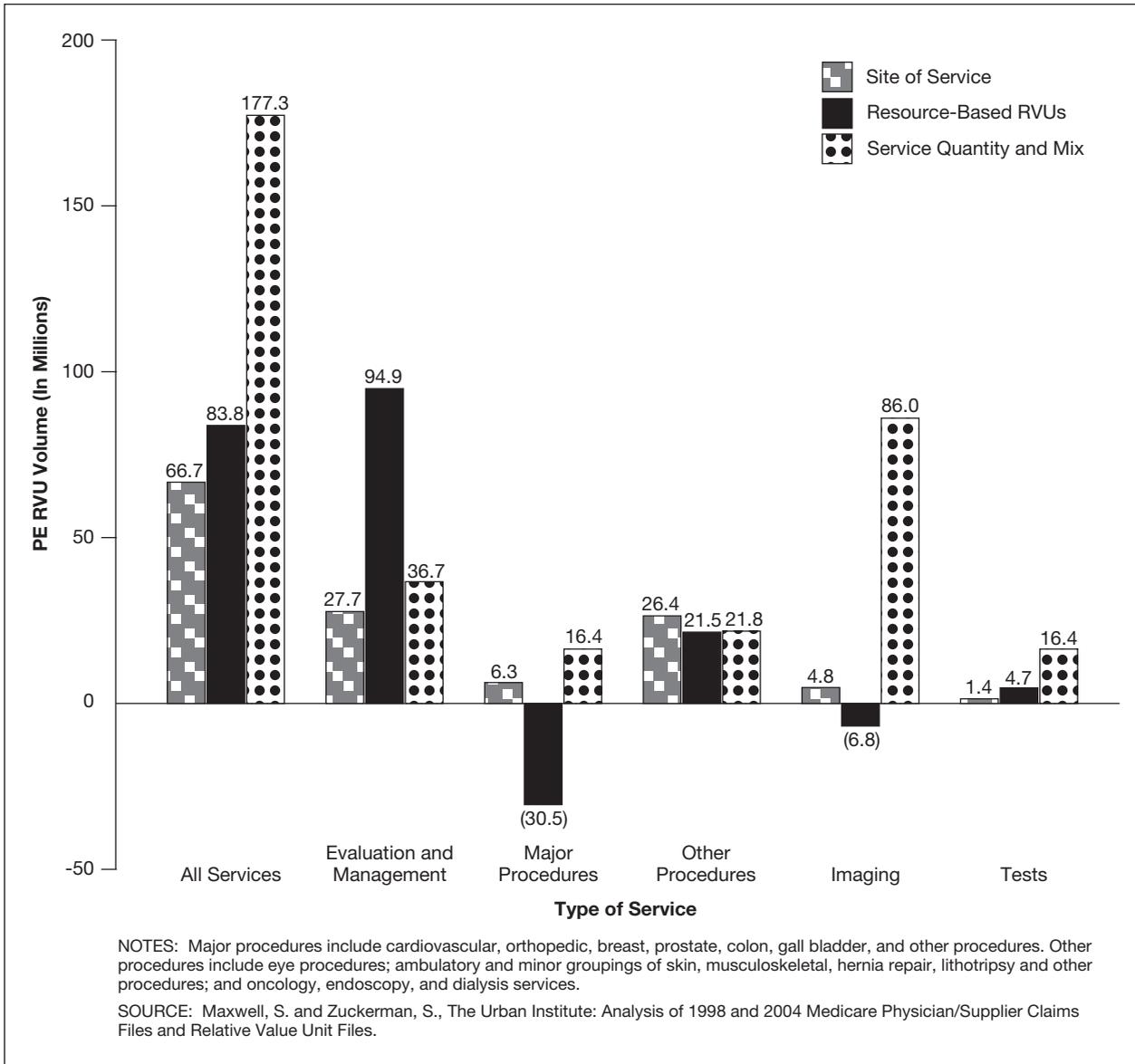
home visits reflect a shift from physicians billing for visits regarding beneficiaries in skilled stays to those in non-skilled stays.<sup>5</sup> Major procedures experienced a volume loss due to implementing RBPE values, but setting shifts among services mainly in the other major procedures group offset some of this loss, particularly regarding prostate procedures such as laser surgery and thermotherapy (data not shown).<sup>6</sup> In the other procedures category, shifts in site of service resulted in increased practice expense volume across a broad range of services, including cataract

<sup>5</sup> This is consistent with the implementation of the skilled nursing facility prospective payment system, which was phased in beginning July 1998. The prospective payment system included a consolidated billing provision, which resulted in physicians now billing skilled nursing facilities directly for services rather than billing Medicare.

<sup>6</sup> Laser surgery and thermotherapy are less invasive alternatives to transurethral resection of the prostate. While this is an inpatient procedure, its alternatives generally are performed in ambulatory settings (Armitage and Emberton, 2006).

Figure 2

Sources of Change in Practice Expense Relative Value Unit (PE RVU) Volume, by Type of Service: 1998-2004



extraction and other eye procedures, several types of skin procedures (found in the ambulatory and minor service groups), and endoscopies (particularly colonoscopies and cystoscopies). In contrast, eye procedures and endoscopies experience an RVU volume decrease due to the shift to RBPE values, whereas a broad range of services in the minor procedure category had substantial increases in volume due resource-based PE RVUs. In

the imaging category, the overwhelming source of growth was due to increases in service quantity and mix, while as expected changes in facility/non-facility designation and the implementation of RBPE values resulted in relatively small changes in RVU growth.

Figure 3 illustrates the decomposition analysis in terms of total (i.e., work, practice expense, and liability insurance) volume. Across all services, service quantity

**Table 3**  
**Sources of Change in Practice Expense Relative Value Unit (PE RVU) Volume, by Detailed Type of Service: 1998-2004**

Type of Service	Amount and Source of Change in PE RVU Volume Due to:			
	Site of Service	Resource-Based PE RVUs	Service Quantity and Mix	Overall
		Million RVUs		
All Services	66.7	83.8	177.3	327.7
Evaluation and Management Visits	27.7	94.9	36.7	159.3
Office/Outpatient	10.2	79.8	12.7	102.8
Hospital	1.7	-9.9	10.4	2.2
Emergency Room	0.0	-5.3	4.9	-0.4
Home	0.0	0.6	0.5	1.1
Nursing Home	5.6	-0.2	-2.9	2.5
Speciality	6.6	27.5	4.1	38.2
Consultations	3.6	2.4	7.0	13.0
Major Procedures	6.3	-30.5	16.4	-7.8
Cardiovascular Major Procedures	1.0	-17.2	7.2	-8.9
Orthopedic Major Procedures	0.5	-6.9	6.6	0.3
Other Major Procedures	4.8	-6.5	2.5	0.8
Other Procedures	26.4	21.5	21.8	69.7
Eye	9.1	-5.3	-4.8	-1.0
Ambulatory	6.2	5.2	2.8	14.2
Minor	6.6	27.2	11.9	45.8
Oncology	0.8	8.3	4.8	13.9
Endoscopy	3.7	-12.7	6.6	-2.4
Dialysis Services	0.0	-1.4	0.4	-0.9
Imaging	4.8	-6.8	86.0	84.0
Standard	1.7	0.2	24.3	26.2
Advanced	1.3	-0.3	36.1	37.2
Echography	1.0	-4.6	23.7	20.1
Imaging/Procedures	0.7	-2.1	1.9	0.5
Tests	1.4	4.7	16.4	22.6
Laboratory	0.2	3.5	1.3	5.0
Other	1.2	1.3	15.1	17.6

NOTE: Non-facility hospital and nursing home visits refer to services not paid under hospital prospective payment system (PPS) rates or under skilled nursing facility PPS rates (e.g., individuals receiving Medicare-covered physician services in residential nursing home stays).

SOURCE: Maxwell, S. and Zuckerman, S., The Urban Institute: Analysis of 1998 and 2004 Medicare Physician/Supplier Claims Files and Relative Value Unit Files.

and mix is the overriding source of total RVU volume growth, increasing it by 437.2 million RVUs. While changes in PE RVUs per service and shifts in site of service were substantial sources of practice expense volume growth in the evaluation and management and other procedures categories, service quantity and mix was the dominant source of growth across each service category when viewing total RVU volume growth.

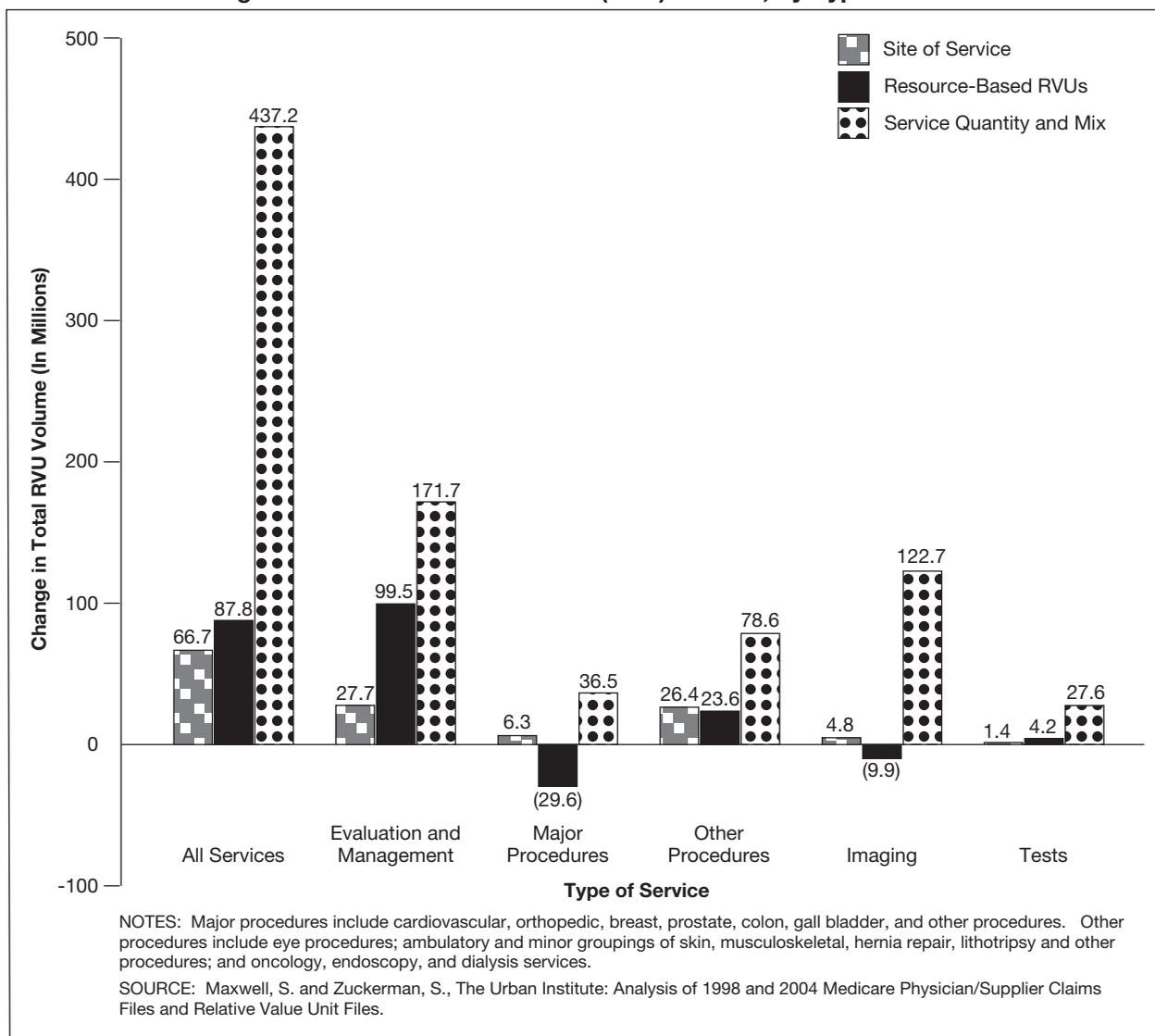
While the relative impact of the factors varies in terms of practice expense volume growth versus total volume growth, note that the absolute levels of volume change due to setting shifts are the same across the

practice expense and total volume analyses. For example, Figures 2 and 3 indicate that across all services, setting shifts increased volume by 66.7 million RVUs (whether PE RVUs or total RVUs). This level of change is the same because practice expense RVU values can vary by setting, but work and liability insurance values do not. Thus, RVU volume changes associated with setting shifts captures change only in practice expense values, whether one is examining practice expense volume or total volume.

Comparing the three factors of growth—changes in site of service (and the corresponding application of site of service differentials), changes in RVU values per

**Figure 3**

**Sources of Change in Total Relative Value Unit (RVU) Volume, by Type of Service: 1998-2004**



service due to implementing resource-based values, and changes in service quantity and mix—the latter factor is the dominant source of growth in terms of total volume, and this factor has a larger relative influence in total volume than it does with regard to practice expense volume. The relative influence of service quantity and mix is larger because practice expense payments represent only about 44 percent, on average, of total payments to physicians, and thus the impact of changes related to PE RVUs and shifts in site of service are diluted when examining total RVU volume.

Table 4 shows the total RVU decomposition results according to detailed BETOS service categories. In the evaluation and management category, office/outpatient, hospital, and consultation visits were the main drivers of growth in service quantity and mix. Among major procedures, cardiovascular and orthopedic were equal drivers of growth in service quantity and mix; and among other procedures, a range of services in the minor procedures group contributed to the growth in quantity and mix. Among imaging services, four types of services were the largest drivers of growth

**Table 4**  
**Sources of Change in Total Relative Value Unit (RVU) Volume, by Detailed Type of Service:**  
**1998-2004**

Type of Service	Amount and Source of Change in Total RVU Volume Due to:			
	Site of Service	Resource-Based RVUs	Service Quantity and Mix	Overall
All Services	66.7	87.8	437.2	591.7
Evaluation and Management Visits	27.7	99.5	171.7	299.0
Office/Outpatient	10.2	81.8	53.9	146.0
Hospital	1.7	-9.4	44.8	37.1
Emergency Room	0.0	-3.5	18.8	15.3
Home	0.0	0.6	2.3	2.9
Nursing Home	5.6	-0.1	1.5	7.1
Speciality	6.6	26.9	21.3	54.8
Consultations	3.6	3.1	29.1	35.8
Major Procedures	6.3	-29.6	36.5	13.2
Cardiovascular Major	1.0	-17.6	14.8	-1.8
Orthopedic Major	0.5	-7.0	14.8	8.4
Other Major	4.8	-5.0	6.8	6.6
Other Procedures	26.4	23.6	78.6	128.6
Eye	9.1	-7.2	1.1	2.9
Ambulatory	6.2	5.9	12.6	24.7
Minor	6.6	30.7	39.9	77.3
Oncology	0.8	9.1	7.4	17.4
Endoscopy	3.7	-13.5	16.7	6.9
Dialysis Services	0.0	-1.5	0.9	-0.6
Imaging	4.8	-9.9	122.7	117.6
Standard	1.7	-0.1	32.2	33.8
Advanced	1.3	-1.3	54.0	53.9
Echography	1.0	-5.7	32.7	28.0
Imaging/Procedures	0.7	-2.8	3.9	1.8
Tests	1.4	4.2	27.6	33.3
Laboratory	0.2	3.5	3.8	7.6
Other	1.2	0.7	23.8	25.7

NOTE: Non-facility hospital and nursing home visits refer to services not paid under hospital prospective payment system (PPS) rates or under skilled nursing facility PPS rates (e.g., individuals receiving Medicare-covered physician services in residential nursing home stays).

SOURCE: Maxwell, S. and Zuckerman, S., The Urban Institute: Analysis of 1998 and 2004 Medicare Physician/Supplier Claims Files and Relative Value Unit Files.

in quantity and mix—(1) nuclear medicine (detail not shown, but is located in the standard imaging group); (2) computerized axial tomography, (3) magnetic resonance imaging (detail not shown, but is located in the advanced imaging group); and (4) echographies of the heart.

## DISCUSSION

Between 1998 and 2004, we found that, across all five main types of services, more services were being provided in physicians' offices. Among major procedures, this shift was driven by, for example, minimally

invasive cardiovascular and a broad range of other services in the major procedures category. In the other procedures category, the shift was driven mainly by eye, minor skin, and endoscopies. These findings are consistent overall with other literature (Pasternak, 2004; Fields, 2003; Society for Ambulatory Anesthesia, 2003) indicating a trend toward furnishing an increasing number of procedures, and increasingly complex ones, in the physician office setting.

Advances in short-acting anesthesia methods have made this trend clinically feasible, and the implementation and

refinement of RBPE RVUs along with the application of site of service differentials to hundreds of additional services have made the physician office setting a more financially feasible setting in many cases. For example, site of service differentials were added to several major orthopedic procedures, and to a range of other major procedures including prostate procedures, skin grafts, and various types of biopsies. Several hundred types of services in the other procedures category gained site of service differentials, including colonoscopies, upper gastrointestinal endoscopies, skin graft and wound, several types of fracture and tendon repairs, and many eye procedures.

In addition to applying site of service differentials to more services, the differentials were changed through the course of implementing RBPE RVUs. Until 1999, there was a 50-percent reduction of the non-facility PE RVU value when a service was provided in a facility, regardless of the service (*Federal Register*, 2002). However, when developing RBPE RVUs, average practice expenses were estimated in both the facility and non-facility settings, for the services that Medicare determined would have a site of service differential. We found that the percentage decrease from a given service's non-facility practice expense value to its facility practice expense value averaged 51 percent, however that percentage spanned the range from nearly no differential, to a 99-percent reduction.

We found that shifts in site of service, and the corresponding application of site of service differentials, were important sources of growth in PE RVU volume for evaluation and management, major and other procedures. For major procedures, volume growth due to site changes offset some of the volume losses attributable to the remaining changes brought by implementing RBPE RVUs.

We have not found other studies examining PE RVUs and site of service differentials across services, but our findings are consistent with one study which examined setting choice and site of service differentials for 20 selected gastrointestinal and urologic endoscopic services furnished to Medicare beneficiaries between 1996 and 2002 (U.S. General Accounting Office, 2002). For example, the U.S. General Accounting Office and our findings indicated little or no change in the share of these 20 services furnished in non-facility settings. However, their study did not examine practice expense or total RVU volume regarding these services.

While growth in service quantity and mix functioned largely as a control variable in this study of the move to PE RVUs and more site of service payment differentials, our findings nonetheless confirm that recent growth in Medicare physician expenditures due to increases in service quantity and mix (Medicare Payment Advisory Commission, 2004). We did not control for growth in the beneficiary population in the study, which rose approximately 1 percent annually over the study period (Centers for Medicare & Medicaid Services, 2006b). Controlling for this population increase would have resulted in our level of growth due to service quantity and mix being slightly smaller than is shown. The Medicare Payment Advisory Commission (2004) recently studied a large number of factors potentially affecting aggregate Medicare spending for physician services, but found beneficiary growth to be a minor source.

These findings suggest that Medicare's expanded application of site of service differentials and implementation of RBPE RVUs were sources of volume growth. In fact, to the extent that site of service shifts in combination with the new PE RVU and site of service payment differentials

contributed to Medicare physician volume growth, these shifts could be a factor leading to the projected fee cuts under the SGR policy and could make the SGR problem harder to address. Although the policy changes (i.e., new PE RVUs and expanded site of service differentials) are factored into the calculation of the SGR targets, actual shifts of services toward the office setting would add to service volume growth and make it more likely that SGR targets would be surpassed.

The payment system changes that were made suggest a conclusion that prior fees were not adequately reflecting differences in practice expenses across sites of services. The Medicare fee schedule was designed so that relative fees would reflect relative resource costs across services, taking setting into account. The policy changes explored in this study were intended to reduce the extent of overpayment or underpayment that may have resulted from the previous PE RVUs and site of service differentials. For example, some physicians may have been providing services in their offices but getting underpaid relative to the practice expenses, while others were providing services in their offices and getting excess payments relative to their practice expenses. Although it is beyond the scope of this study to assess the accuracy of the RBPE RVUs that were implemented, the changes may be better reflecting the range of clinically appropriate settings for certain services.

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