Medicare Fees and the Volume of Physicians' Services

Technical Appendices

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Technical Appendix A

Construction of the Medicare Fee Difference (MFD) Variable

The key policy variable in the analysis is the Medicare fee difference (MFD). MFD measures the difference between the amount physicians are actually paid for a particular service (given where they practice), and the amount they would receive if CMS used a formula that more closely conformed to the goal of payment neutrality implicit in the Resource Based Relative Value System (RBRVS). Under RBRVS, the fee for each service would be set equal to the average cost of its provision by an efficient provider. There are multiple reasons why the current fee schedule varies from this goal, only some of which we are able to incorporate in MFD. In addition, RBRVS does not guarantee that fees are updated to reflect inflation and our measure captures the variation in fees over the period 2000-2005, when annual fee updates failed to keep up with inflation, effectively lowering real fee levels.

The Medicare Physician Fee Formula.

To understand the construction of MFD, one needs to start with the basic Medicare payment formula for physician services which is the basis of RBRVS. Each of over 7,000 services is assigned a number of relative value units (RVUs) covering three components of its cost:

1) physician work, which represents the time, effort, skill, and stress associated with providing the service;

2) practice expense, which incorporates the cost of office space, supplies and equipment, and administrative and support staff; and

3) professional liability insurance premiums.

These three RVU values are adjusted by local differences in input costs (e.g. the cost of providing physician services is more expensive in New York City than in Topeka, Kansas) and

summed. This total is then converted into a dollar value by multiplying by a constant term known as the conversion factor, which is updated annually.

More formally, the full payment (allowed charge) inclusive of payments from patients and other insurers in any given year[1] for a given service i provided by a physician practicing in locality j (Paymt$_{ij}$) is given by:

$$(1) \quad Paymt_{ij} = \left[\left(WKRVU_i * WKGPCI_j \right) + \left(PERVU_i * PEGPCI_j \right) + \left(PLIRVU_i * PLIGPCI_j \right) \right] * CF$$

where WKRVU, PERVU, and PLIRVU are the physician work, practice expense, professional liability insurance RVU values assigned to each service. These are multiplied by their corresponding geographic practice cost indices (GPCI), *WKGPCI, PEGPCI*, and *PLIGPCI*, respectively. GPCIs are constructed so that a value of one represents the national average. GPCIs are defined across 89 geographic payment areas (indicated by j) and represent differences in local prices of these inputs. *CF* is the national conversion factor.

There is one additional component to the basic formula shown above. The Medicare Incentive Payment Program, which is intended to encourage physician supply in underserved areas, pays a percentage increment on top of the basic Medicare payment to physicians who practice in designated underserved areas. This adds an additional component to the formula shown in Equation 1:

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[1] Although RVU, GPCI, and Bonus values may change from year to year due to CMS updates or legislative changes, we omit the subscript *t* for the sake of simplicity.

$$(2) \quad Paymt_{ij} = \left[\left(WKRVU_i * WKGPCI_j \right) + \left(PERVU_i * PEGPCI_j \right) + \left(PLIRVU_i * PLIGPCI_j \right) \right] *$$
$$CF * Bonus$$

Bonus is a fixed multiplier term greater than one (currently 1.1) that is applied only if the physician qualifies under the Medicare Incentive Program.

Construction of MFD

Although the RBRVS system was based on payment neutrality, subsequent policy decisions and the implementation of the payment formula have deviated from this goal. As a result, some physicians will be paid more generously (after accounting for local input prices) than others for providing a given service. We exploit these variations in fees to construct MFD. Moreover, under the SGR, overall Medicare fees have been falling in real terms, another variation that MFD captures.

We define MFD for service *i* in area *j* as

$$(3) \quad MFD_{ij} = Paymt_{ij} - Paymt_{ij}^*,$$

where ($Paymt_{ij}^*$) represents our best attempt to represent more accurately physician payments under the RBRVS payment neutrality goal. As explained below, there are a number of factors (apart from the Medicare Incentive Program) that make the current payment system deviate from an "ideal" RBRVS system. We are able to capture some, though not all of these factors. As a consequence, MFD represents differences in the generosity of physician payment for providing a given service i across geography and time.

The precise formula for $Paymt_{ij}^*$ follows from the basic RBRVS formula in equation 1, but replaces several of the right hand side variables in order to generate a more accurate measure of the hypothetical ideal RBRVS fee, which would approximate the minimum average cost of providing the service. The formula for $Paymt_{ij}^*$ is given by:

$$(4) \quad Paymt_{ij}^* = \left[\left(WKRVU_i * WKGPCI_j^*\right) + \left(PERVU_i^* * PEGPCI_j^*\right) + \left(PLIRVU_i * PLIGPCI_j\right)\right]$$
$$*CF^*$$

where the terms with an asterisk replace the corresponding factors in the actual payment formula. Note that we did not replace *WKRVU* or the malpractice liability components of the formula because there are no systematic data on more accurate service-specific values for these terms. Moreover, since professional liability insurance premiums tend to be fixed costs, they don't contribute to variations in the marginal cost of providing services that we are ultimately attempting to capture. The following subsections provide the details on the construction of the replacement variables indicated in equation 4.

Physician work GPCI (WKGPCI*)

In constructing the physician work GPCI, CMS uses data from the decennial census on the average of the median hourly wages of six non-physician professional categories in a geographic area relative to the national average. Once the index is constructed for each of the 89 payment areas, two adjustments are applied. These adjustments reflect Congressional attempts to reimburse physicians who practice in rural areas more generously than those in urban areas as a means of ensuring an adequate supply of rural physicians and access to care for rural beneficiaries. In the first adjustment, only one fourth of the variation from the national average is applied. For instance, if a locality has professional wages 20% over the national average, its

physician work GPCI would equal 1.05 rather than 1.20. Similarly, if a locality had average wages 20% below the national average, their physician work GPCI value would be 0.95 rather than 0.80. The second adjustment, included in the Medicare Modernization Act of 2003 and implemented in 2005, increased the value of *WKGPCI* to a floor value of 1.0 for all payment localities with a physician work GPCI value less than 1.0.

To create WKGPCI*, we made two alterations to the physician work GPCI used by CMS. First, we generated values that did not incorporate the two pro-rural provisions. Second, we defined GPCI values smaller geographic areas than the 89 payment areas used by CMS. Almost all of the 89 payment areas encompass multiple counties and some correspond to entire states. As a result, there are considerable differences in input costs (in this case wage levels for professionals) within the payment areas. We used the same data as CMS in creating our GPCI values (2000 wage data from the Census Bureau), but calculated a GPCI value for each urban county and the non-metropolitan area of each state.

Practice expense RVU (PERVU)*

In the original RBRVS payment formula first implemented in 1992, services' practice expense RVU assignments were based on physicians' historical charges. The Social Security Amendments of 1994 required CMS develop a methodology for a resource-based system for determining practice expenses for each physician service that could affect the number of practice expense RVUs assigned to each service. The Balanced Budget Act of 1997 required that this new methodology be phased in over four years beginning in 1999.

The change in methodology did in fact alter the practice expense RVU assignments across services, as documented by MedPAC.[2] Since the resource-based assignments are thought to be a

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[2] Medicare Payment Advisory Commission, *Report to the Congress, Impact of Resource-Based Practice Expense Payments for Physician Service,* December, 2004.

superior reflection of actual practice expenses, we defined *PERVU** as the fully implemented

resource-based RVU assignment. This affected values in 2000, when we replaced RVU

assignments that were the average of charge-based and resource-based values with fully

implemented resource-based units. In 2005, after the resource-based RVUs were fully

implemented, PERVU=PERVU*.[3] Note that many believe that even under the resource-based

approach, many practice expense RVU assignments are inaccurate, but we lacked data to make

further adjustments in RVU values.[4]

Practice Expense GPCI (PEGPCI*)

The practice expense GPCI is a weighted average of three separate geographic price indices

representing local wage levels for office support staff, physician office real estate costs, and the

cost of capital equipment. The weights assigned to these three components are 0.40, 0.27, and

0.33, respectively. The labor component is based on decennial census data on the relative wages

of registered nurses, licensed practical nurses, health technicians, and administrative staff. We

replaced the current PEGPCI employee wage index with an alternative developed by MedPAC

that is derived from Bureau of Labor Statistics (BLS) data, standardizes for the mix of

professions in hospitals, and is available for areas that are closer approximations to actual input

labor markets than the current set of Medicare physician payment localities.[5] This alternative,

MedPAC-constructed hospital wage index standardizes the labor shares of workers of various

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[3] CMS began implementing new methods for calculating PERVUs in 2007. Since these methods post dated our study period, they were not incorporated into PERVU*. See MedPAC, *Report to Congress: Prompting Greater Efficiency in Medicare.* Chapter 9, Analysis of Changes to Physicians' Practice Expense Payments. June 2007.

[4] For instance, for many high tech imaging equipment, there is an assumption that the equipment is only used half the time, an assumption that unlikely reflects current reality.

[5] MedPAC, *Report to Congress: Promoting Greater Efficiency in Medicare.* Chapter 6, An Alternative Method to Compute the Wage Index. Pp. 123-141. June 2007.

professions (e.g. RNs, administrative staff, etc.). In contrast, the hospital wage index used in the PEGPCI reflected the actual mix of labor employed in local hospitals, and as such, was not a pure wage index. Moreover the MedPAC index, which is constructed using BLS data from the Occupational Employment Statistics (OES) Survey, is generated at the county level, again providing greater geographic accuracy than CMS uses. Although occupational shares are based on employment in hospitals as opposed to physician offices, the types of labor used in both settings are similar and relative wage rates are highly correlated. The MedPAC index, which was constructed using data from May 2005 OES data, was applied to claims from both 2000 and 2005, reflecting the availability of the new MedPAC index and the likely stability of relative wages over a short time period.

For the office rent component, we again replicate CMS methods but introduce greater geographic granularity. CMS uses an index based on fair market rents (FMR) from the Annual Housing Survey conducted by the Department of Housing and Urban Development, since there are no adequate data on physicians' actual office space costs. We also use the fair market rents, which are based on the 40th percentile rent for two bedroom apartments of decent quality, but unlike CMS, we define the index at the MSA and nonmetropolitan portion of state level, rather than at the Medicare payment area level. Separate FMR data are used for 2000 and 2005.

The last component of physician practice expense GPCI is for equipment and supply costs. CMS assumes that the index value for these costs is 1.0 for all physicians, on the assumption that equipment and supplies are sold on a national market. In the absence of better data, we make the same assumption in constructing *PEGPCI**.

Conversion Factor (CF*)

The conversion factor translates the geographically-adjusted RVUs for each service into a dollar payment. Its value is set annually by Congress to reflect changes in the costs of providing

physician services, subject to the Sustainable Growth Rate Formula (SGR). Since 2000, the

SGR has constrained the annual increase in the conversion factor because per beneficiary

Medicare costs rose faster than the growth of the economy. With the exception of 2002, when

the SGR reduced the value of the conversion factor, Congress has intervened annually to prevent

further SGR-mandated reductions in the conversion factor. Nonetheless, the conversion factor

rate has increased more slowly than the growth in the Medicare Economic Index (MEI), which

tracks the cost of medical care inputs. As a result, inflation-adjusted Medicare fees in 2005 were

11% lower than in 2000. As our analyses are expressed in 2005 dollars, we inflated 2000 fees by

11% to account for this discrepancy.

Bonus

The final alteration we make is to eliminate the *Bonus* term when constructing $Paymt_{ij}^{*}$. Like

alterations made to the WKGPCI term, the bonus payment represents an adjustment to the

RBRVS system to achieve other social goals. This change had different effects in 2000 and

2005, as Congress altered the Medicare Incentive Payment Program by increasing incentive

payments between 2000 and 2005 and altering the procedure for identifying physicians eligible

for receiving the bonuses. In 2000, physicians had to include a modifier on claims that indicated

their eligibility, whereas in 2005, bonus payments were based on the practice zip code of the

provider. Localities designated as medically underserved or shortage areas also changed over

time.

      Due to the lack of better data, no alterations were made to the professional liability

insurance components of the Medicare fee formula.

Technical Appendix B.

Full Multivariate Results

NOTE: Each model included a set of site fixed effects dummy variables to control for unobserved local market supply and demand factors. Coefficients on these variables have been ommitted from the appendix tables.

Table B1. GLM output for office visits with established patients, CPT=99213

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	0.002	0.946	0.014	0.195
Physician Characteristics				
Gender=Male	0.198 *	0.087	0.507 ***	0.000
Years in Practice	-0.008	0.237	0.015 ***	0.000
Int'l. Medical Graduate	0.196	0.135	-0.021	0.711
Doctor of Osteopathy	-0.157	0.287	-0.016	0.824
Board Certified	0.267	0.138	0.076	0.238
Race/Ethnicity (ref. Grp=White)				
Hispanic	-0.069	0.751	0.014	0.918
African American	-0.308	0.135	-0.332 **	0.029
Asian	-0.365 **	0.024	0.164 **	0.016
Other Race	-0.620 **	0.029	-0.108	0.359
Race information missing	0.227	0.434	0.069	0.672
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	0.317	0.346	-0.364 *	0.059
Family practice	0.436 ***	0.005	-0.411 ***	0.000
Allergy and immunology	3.889 ***	0.000	-1.402 ***	0.000
Cardiology	1.814 ***	0.000	-0.159	0.201
Critical care med.	-2.251 ***	0.000	-0.415 ***	0.002
Dermatology	1.792 ***	0.001	-0.419 ***	0.002
Endocrinology	1.441 **	0.024	-0.464 **	0.028
Gastroenternology	1.524 ***	0.000	-0.925 ***	0.000
Infectious diseases	1.739 ***	0.000	-1.346 ***	0.000
Nephrology	1.653 **	0.039	-0.445 ***	0.002
Neurology	0.798 **	0.013	-0.952 ***	0.000
OM/PMR	-0.067	0.820	-1.369 ***	0.000
Oncology	2.328 ***	0.000	0.059	0.618
Other med spec	0.515	0.199	-1.570 ***	0.000
Psychiatry	-4.648 ***	0.000	-2.248 ***	0.000
Cardio surgery	0.359	0.420	-2.900 ***	0.000
General surgery	0.201	0.484	-2.044 ***	0.000
Obstetrics & gynecology	-0.675 ***	0.003	-2.814 ***	0.000
Opthalmology	-0.362	0.221	-0.638 ***	0.002
Orthopedics	0.598	0.246	-1.166 ***	0.000
Other surgical spec	0.243	0.505	-1.331 ***	0.000
Otolalryngology	0.830 *	0.067	-0.613 ***	0.000
Plastic surgery	-0.534	0.347	-2.764 ***	0.000
Urology	1.772 ***	0.000	-0.196 *	0.071
Strong/Mod. Financial incentives (ref. Grp.=	0.861 ***	0.000	0.225 ***	0.000
Case mix severity (ave. HCC score)	-0.755 ***	0.000	-0.379 ***	0.000
Practice type (ref. Grp.=group<4 phys)				
Groups with 4-10 phys.	-0.072	0.706	0.008	0.846
Groups with 11-49 phys.	-0.401	0.101	-0.037	0.595
Groups with 50+ phys.	-0.507 **	0.037	0.044	0.604
Hospital-based	-0.503 **	0.014	-0.220 ***	0.001
HMO	-1.042 ***	0.000	-0.806 ***	0.000
Medical school	-0.033	0.894	-0.285 ***	0.005

Table B1. GLM output for office visits with established patients, CPT=99213 (continued)

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Other	-0.951 ***	0.000	-0.336 ***	0.000
Weekly hrs. direct pt. care	0.010 ***	0.005	0.016 ***	0.000
Year=2005	-0.337 **	0.039	0.195 ***	0.001
Demand shift variables				
Accepts all/most new private pts.	-0.211	0.230	-0.129 ***	0.009
Treats Medicaid patients	0.267 *	0.060	0.106	0.126
Mkt. for phys. services very competitive	-0.052	0.737	-0.043	0.349
Cross price term (fee difference per work	-0.060 **	0.048	0.022 *	0.066
Ave. prob. Medicare pts. have supple. ins.	1.480 **	0.038	0.946 **	0.014
Intercept	0.949 *	0.099	5.057 ***	0.000

***p≤0.01; **p≤0.05; *p≤0.10

Table B2. GLM output for office visits with established patients, CPT=99214

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	-0.005	0.739	0.004	0.604
Physician Characteristics				
Gender=Male	0.008	0.929	0.182 ***	0.001
Years in Practice	0.002	0.525	0.014 ***	0.000
Int'l. Medical Graduate	0.176	0.162	0.037	0.571
Doctor of Osteopathy	-0.383 **	0.013	-0.136	0.204
Board Certified	0.292 **	0.038	0.144	0.109
Race/Ethnicity (ref. Grp=White)				
Hispanic	-0.090	0.647	0.308 ***	0.004
African American	-0.211	0.377	-0.150	0.155
Asian	-0.260 **	0.029	-0.082	0.297
Other Race	-0.279	0.330	-0.110	0.470
Race information missing	-0.144	0.547	-0.223	0.198
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	0.062	0.874	-0.687 ***	0.000
Family practice	0.197	0.187	-0.482 ***	0.000
Allergy and immunology	0.311	0.487	-1.459 ***	0.000
Cardiology	1.367 ***	0.000	0.157	0.176
Critical care med.	-2.035 ***	0.000	-0.490 ***	0.001
Dermatology	-2.350 ***	0.000	-1.839 ***	0.000
Endocrinology	1.274 **	0.012	0.016	0.923
Gastroenternology	0.473	0.131	-1.152 ***	0.000
Infectious diseases	0.896 *	0.057	-1.543 ***	0.000
Nephrology	2.284 ***	0.000	-0.436 **	0.020
Neurology	1.427 ***	0.000	-0.572 ***	0.000
OM/PMR	-0.630 **	0.016	-1.566 ***	0.000
Oncology	1.903 ***	0.000	0.422 ***	0.000
Other med spec	-0.044	0.931	-1.349 ***	0.000
Psychiatry	-4.399 ***	0.000	-1.850 ***	0.000
Cardio surgery	-0.604	0.151	-2.503 ***	0.000
General surgery	-0.398 **	0.046	-2.257 ***	0.000
Obstetrics & gynecology	-1.218 ***	0.000	-2.360 ***	0.000
Opthalmology	-0.945 ***	0.001	-1.155 ***	0.000
Orthopedics	-0.448 **	0.039	-1.656 ***	0.000
Other surgical spec	-0.382	0.197	-2.045 ***	0.000
Otolalryngology	-0.711 ***	0.003	-1.287 ***	0.000
Plastic surgery	-1.775 ***	0.004	-2.494 ***	0.000
Urology	0.172	0.595	-0.777 ***	0.000
Strong/Mod. Financial incentives (ref. Grp.=	0.783 ***	0.000	0.505 ***	0.000
Case mix severity (ave. HCC score)	-0.574 ***	0.000	-0.124 **	0.012
Practice type (ref. Grp.=group<4 phys)				
Groups with 4-10 phys.	-0.233 **	0.047	-0.183 ***	0.005
Groups with 11-49 phys.	-0.471 ***	0.004	-0.070	0.476
Groups with 50+ phys.	-0.548 ***	0.004	-0.265 **	0.013
Hospital-based	-0.519 ***	0.002	-0.286 ***	0.000
HMO	-1.472 ***	0.000	-0.763 ***	0.000
Medical school	-0.187	0.365	-0.480 ***	0.000
Other	-0.898 ***	0.000	-0.274 ***	0.005
Weekly hrs. direct pt. care	0.015 ***	0.000	0.014 ***	0.000

Table B2. GLM output for office visits with established patients, CPT=99214 (continued)

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Year=2005	-0.053	0.664	0.500 ***	0.000
Demand shift variables	***		***	
Accepts all/most new private pts.	-0.392 ***	0.001	-0.108 *	0.094
Treats Medicaid patients	0.179	0.111	-0.033	0.660
Mkt. for phys. services very competitive	0.009	0.931	0.018	0.742
Cross price term (fee difference per work	-0.042 *	0.096	0.020 *	0.098
Ave. prob. Medicare pts. have supple. ins.	2.039 ***	0.003	0.546	0.162
Intercept	-0.798	0.194	2.833 ***	0.000

***p≤0.01; **p≤0.05; *p≤0.10

Table B3. GLM output for hospital visits for subsequent care, CPT=99232

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	0.056 ***	0.000	0.010	0.225
Physician Characteristics				
Gender=Male	0.301 ***	0.002	0.404 ***	0.000
Years in Practice	-0.020 ***	0.000	0.005	0.118
Int'l. Medical Graduate	-0.046	0.711	-0.035	0.641
Doctor of Osteopathy	-0.281 **	0.034	-0.158	0.272
Board Certified	0.223 *	0.065	0.062	0.473
Race/Ethnicity (ref. Grp=White)				
Hispanic	-0.081	0.648	-0.036	0.762
African American	-0.563 ***	0.005	-0.396 ***	0.001
Asian	0.256 *	0.092	-0.021	0.822
Other Race	-0.206	0.490	0.106	0.468
Race information missing	0.262	0.357	-0.231	0.122
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	-0.589 **	0.021	-0.493	0.133
Family practice	-0.434 ***	0.001	-0.577 ***	0.000
Allergy and immunology	-3.233 ***	0.000	-1.111 *	0.075
Cardiology	0.155	0.717	-0.017	0.866
Critical care med.	-3.247 ***	0.000	-0.315 ***	0.010
Dermatology	-3.150 ***	0.000	-3.266 ***	0.000
Endocrinology	1.555 ***	0.000	-0.466 *	0.100
Gastroenternology	0.439 *	0.075	-0.568 ***	0.000
Infectious diseases	-1.508 ***	0.003	-0.974 ***	0.000
Nephrology	0.105	0.835	-1.005 ***	0.000
Neurology	-0.672 ***	0.003	-0.674 ***	0.001
OM/PMR	-1.358 ***	0.000	0.071	0.718
Oncology	-0.521 **	0.048	-0.533 ***	0.000
Other med spec	-3.357 ***	0.000	-0.918 **	0.028
Psychiatry	-2.158 ***	0.000	-0.728 ***	0.000
Cardio surgery	-3.903 ***	0.000	-3.830 ***	0.000
General surgery	-1.068 ***	0.000	-2.099 ***	0.000
Obstetrics & gynecology	-3.715 ***	0.000	-2.576 ***	0.000
Opthalmology	-2.946 ***	0.000	-3.489 ***	0.000
Orthopedics	-1.422 ***	0.000	-2.426 ***	0.000
Other surgical spec	-1.015 ***	0.002	-1.917 ***	0.000
Otolalryngology	-1.845 ***	0.000	-2.294 ***	0.000
Plastic surgery	-2.447 ***	0.000	-4.610 ***	0.000
Urology	-0.496 *	0.064	-1.832 ***	0.000
Strong/Mod. Financial incentives (ref. Grp.=	0.641 ***	0.000	0.387 ***	0.000
Case mix severity (ave. HCC score)	1.227 ***	0.000	0.864 ***	0.000
Practice type (ref. Grp.=group<4 phys)				
Groups with 4-10 phys.	0.284 **	0.015	-0.128	0.109
Groups with 11-49 phys.	0.138	0.324	-0.046	0.636
Groups with 50+ phys.	-0.102	0.565	-0.254 **	0.048
Hospital-based	-0.085	0.538	-0.292 ***	0.008
HMO	-0.795 ***	0.004	-0.592 ***	0.000
Medical school	0.065	0.685	-0.959 ***	0.000
Other	-0.459 ***	0.001	-0.233 *	0.055
Weekly hrs. direct pt. care	0.029 ***	0.000	0.014 ***	0.000

Table B3. GLM output for hospital visits for subsequent care, CPT=99232 (continued)

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Year=2005	0.001	0.995	0.161 *	0.063
Demand shift variables				
Accepts all/most new private pts.	-0.130	0.248	-0.213 ***	0.004
Treats Medicaid patients	0.672 ***	0.000	0.035	0.681
Mkt. for phys. services very competitive	-0.082	0.453	0.106 *	0.066
Cross price term (fee difference per work	-0.025	0.302	-0.010	0.448
Ave. prob. Medicare pts. have supple. ins.	2.311 ***	0.000	1.149 **	0.023
Intercept	-5.319 ***	0.000	1.955 ***	0.000

***p≤0.01; **p≤0.05; *p≤0.10

Table B4. GLM output for hospital visits for subsequent care, CPT=99233

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	0.031 ***	0.000	-0.002	0.744
Physician Characteristics				
Gender=Male	0.329 ***	0.000	0.323 ***	0.000
Years in Practice	-0.022 ***	0.000	0.005	0.308
Int'l. Medical Graduate	-0.056	0.654	-0.128	0.156
Doctor of Osteopathy	-0.390 ***	0.004	0.256 **	0.015
Board Certified	0.385 ***	0.004	-0.200	0.143
Race/Ethnicity (ref. Grp=White)				
Hispanic	0.062	0.704	0.234	0.127
African American	-0.419 **	0.038	0.111	0.581
Asian	0.151	0.240	0.224 **	0.017
Other Race	-0.111	0.697	0.101	0.647
Race information missing	0.079	0.808	0.004	0.987
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	-1.177 ***	0.000	-0.944 ***	0.000
Family practice	-0.597 ***	0.000	-0.545 ***	0.000
Allergy and immunology	-2.804 ***	0.000	-0.921	0.266
Cardiology	0.516	0.136	0.010	0.956
Critical care med.	-2.535 ***	0.000	0.337 **	0.019
Dermatology	-3.538 ***	0.000	-1.480	0.127
Endocrinology	0.173	0.684	-0.829 ***	0.000
Gastroenternology	-0.473 **	0.027	-0.714 ***	0.000
Infectious diseases	-1.515 ***	0.003	-1.193 ***	0.000
Nephrology	0.127	0.781	-1.225 ***	0.000
Neurology	-0.885 ***	0.000	-0.334	0.280
OM/PMR	-1.765 ***	0.000	-0.532 *	0.077
Oncology	-0.713 **	0.016	-0.518 **	0.025
Other med spec	-3.641 ***	0.000	0.265	0.561
Psychiatry	-1.873 ***	0.000	-0.901 ***	0.000
Cardio surgery	-3.482 ***	0.000	-0.831	0.393
General surgery	-1.811 ***	0.000	-2.192 ***	0.000
Obstetrics & gynecology	-4.487 ***	0.000	-2.552 ***	0.000
Opthalmology	-3.192 ***	0.000	-3.434 ***	0.000
Orthopedics	-2.757 ***	0.000	-2.893 ***	0.000
Other surgical spec	-1.735 ***	0.000	-2.553 ***	0.000
Otolalryngology	-2.255 ***	0.000	-2.166 ***	0.000
Plastic surgery	-4.344 ***	0.000	-3.224 ***	0.000
Urology	-1.734 ***	0.000	-1.582 ***	0.000
Strong/Mod. Financial incentives (ref. Grp.=	0.919 ***	0.000	0.193 **	0.023
Case mix severity (ave. HCC score)	1.106 ***	0.000	0.783 ***	0.000
Practice type (ref. Grp.=group<4 phys)				
Groups with 4-10 phys.	0.093	0.366	-0.231 ***	0.009
Groups with 11-49 phys.	-0.111	0.509	-0.122	0.338
Groups with 50+ phys.	-0.308 *	0.068	-0.341 **	0.027
Hospital-based	-0.167	0.192	-0.471 ***	0.001
HMO	-1.079 ***	0.000	-0.701 ***	0.005
Medical school	-0.018	0.922	-0.892 ***	0.000
Other	-0.316 *	0.067	-0.349 ***	0.003
Weekly hrs. direct pt. care	0.027 ***	0.000	0.014 ***	0.000

Table B4. GLM output for hospital visits for subsequent care, CPT=99233 (continued)

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Year=2005	0.140	0.264	0.036	0.678
Demand shift variables				
Accepts all/most new private pts.	-0.123	0.371	0.005	0.960
Treats Medicaid patients	0.270 *	0.058	0.093	0.512
Mkt. for phys. services very competitive	0.018	0.865	0.155 *	0.092
Cross price term (fee difference per work	-0.021	0.402	-0.009	0.590
Ave. prob. Medicare pts. have supple. ins.	2.357 ***	0.000	0.689	0.137
Intercept	-5.691 ***	0.000	1.413 ***	0.001

***p≤0.01; **p≤0.05; *p≤0.10

Table B5. GLM output for consultation, CPT=99243

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	0.022 ***	0.002	-0.003	0.546
Physician Characteristics				
Gender=Male	0.361 ***	0.000	0.439 ***	0.000
Years in Practice	-0.024 ***	0.000	-0.010 ***	0.009
Int'l. Medical Graduate	-0.347 ***	0.003	0.050	0.532
Doctor of Osteopathy	-0.207	0.190	0.090	0.605
Board Certified	0.456 ***	0.003	0.100	0.512
Race/Ethnicity (ref. Grp=White)				
Hispanic	-0.355 **	0.041	-0.114	0.402
African American	-0.700 ***	0.002	-0.316	0.264
Asian	0.054	0.666	-0.071	0.480
Other Race	-0.047	0.858	-0.304	0.165
Race information missing	0.200	0.579	-0.016	0.938
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	-1.128 ***	0.002	-0.208	0.389
Family practice	-0.969 ***	0.000	-0.523 ***	0.000
Allergy and immunology	1.357 ***	0.000	-0.217	0.283
Cardiology	1.610 ***	0.000	0.711 ***	0.000
Critical care med.	-1.114 ***	0.000	0.978 ***	0.000
Dermatology	0.843 ***	0.003	1.242 ***	0.000
Endocrinology	1.653 ***	0.001	0.640 ***	0.001
Gastroenternology	2.526 ***	0.000	1.651 ***	0.000
Infectious diseases	1.117 ***	0.005	0.642 **	0.039
Nephrology	0.157	0.665	0.815 ***	0.004
Neurology	1.569 ***	0.000	0.926 ***	0.000
OM/PMR	0.904 ***	0.000	1.063 ***	0.000
Oncology	1.141 ***	0.000	0.758 ***	0.004
Other med spec	0.726	0.155	-0.004	0.993
Psychiatry	-2.329 ***	0.000	-0.645	0.105
Cardio surgery	1.913 ***	0.000	1.259 ***	0.000
General surgery	1.903 ***	0.000	1.296 ***	0.000
Obstetrics & gynecology	-0.302 *	0.084	-0.477 ***	0.001
Opthalmology	1.259 ***	0.000	1.262 ***	0.000
Orthopedics	1.487 ***	0.000	1.293 ***	0.000
Other surgical spec	1.385 ***	0.000	1.678 ***	0.000
Otolalryngology	2.179 ***	0.000	2.055 ***	0.000
Plastic surgery	1.426 ***	0.004	0.978 ***	0.004
Urology	2.333 ***	0.000	1.794 ***	0.000
Strong/Mod. Financial incentives (ref. Grp.=	0.409 ***	0.000	-0.075	0.447
Case mix severity (ave. HCC score)	-0.026	0.644	-0.404 ***	0.000
Practice type (ref. Grp.=group<4 phys)				
Groups with 4-10 phys.	0.201 **	0.047	0.018	0.832
Groups with 11-49 phys.	0.389 ***	0.003	0.119	0.191
Groups with 50+ phys.	0.527 ***	0.002	0.315 *	0.065
Hospital-based	-0.072	0.609	-0.164	0.116
HMO	-0.509 **	0.043	-0.328	0.113
Medical school	0.157	0.331	-0.265 *	0.054
Other	-0.300 ***	0.010	0.014	0.884
Weekly hrs. direct pt. care	0.013 ***	0.000	0.008 ***	0.005

Table B5. GLM output for consultation, CPT=99243 (continued)

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Year=2005	0.439 ***	0.000	0.188 **	0.020
Demand shift variables				
Accepts all/most new private pts.	0.133	0.310	-0.156 *	0.077
Treats Medicaid patients	0.408 ***	0.001	-0.013	0.886
Mkt. for phys. services very competitive	0.029	0.754	0.039	0.498
Cross price term (fee difference per work	-0.023	0.272	0.002	0.912
Ave. prob. Medicare pts. have supple. ins.	2.299 ***	0.001	-1.000 *	0.072
Intercept	-4.900 ***	0.000	3.037 ***	0.000

***p≤0.01; **p≤0.05; *p≤0.10

Table B6. GLM output for consultations, CPT=99244

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	0.003	0.528	0.002	0.714
Physician Characteristics				
Gender=Male	0.261 ***	0.005	0.367 ***	0.001
Years in Practice	-0.026 ***	0.000	-0.006	0.177
Int'l. Medical Graduate	-0.055	0.635	0.086	0.408
Doctor of Osteopathy	-0.391 **	0.011	-0.010	0.936
Board Certified	0.424 ***	0.000	0.156	0.329
Race/Ethnicity (ref. Grp=White)				
Hispanic	-0.217	0.231	-0.230	0.212
African American	-0.344	0.129	-0.611 ***	0.002
Asian	-0.212	0.118	-0.179 *	0.070
Other Race	-0.217	0.411	-0.104	0.631
Race information missing	0.499	0.186	-0.216	0.310
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	-1.654 ***	0.000	-1.180 ***	0.000
Family practice	-1.248 ***	0.000	-1.004 ***	0.000
Allergy and immunology	1.593 ***	0.000	-0.262	0.179
Cardiology	2.491 ***	0.000	0.931 ***	0.000
Critical care med.	-0.667 ***	0.000	1.175 ***	0.000
Dermatology	-1.182 ***	0.002	-0.814 ***	0.000
Endocrinology	2.500 ***	0.000	0.644 **	0.030
Gastroenternology	2.430 ***	0.000	1.163 ***	0.000
Infectious diseases	0.954 **	0.015	-0.216	0.440
Nephrology	1.449 ***	0.000	0.942 ***	0.003
Neurology	2.315 ***	0.000	1.485 ***	0.000
OM/PMR	0.555 **	0.025	0.198	0.397
Oncology	2.512 ***	0.000	0.708 ***	0.000
Other med spec	0.954	0.114	-0.496 **	0.033
Psychiatry	-2.540 ***	0.000	-0.722 **	0.023
Cardio surgery	2.099 ***	0.000	0.455	0.179
General surgery	1.225 ***	0.000	0.340 **	0.040
Obstetrics & gynecology	-0.847 ***	0.000	-0.884 ***	0.000
Opthalmology	1.327 ***	0.000	1.475 ***	0.000
Orthopedics	0.688 ***	0.002	0.199	0.282
Other surgical spec	1.785 ***	0.000	0.911 ***	0.000
Otolalryngology	1.279 ***	0.000	0.285	0.150
Plastic surgery	0.166	0.739	-0.021	0.943
Urology	1.713 ***	0.000	0.733 ***	0.000
Strong/Mod. Financial incentives (ref. Grp.=	0.718 ***	0.000	-0.023	0.845
Case mix severity (ave. HCC score)	0.034	0.594	-0.214 ***	0.005
Practice type (ref. Grp.=group<4 phys)				
Groups with 4-10 phys.	-0.010	0.925	-0.061	0.497
Groups with 11-49 phys.	-0.087	0.498	0.018	0.861
Groups with 50+ phys.	0.115	0.494	-0.054	0.719
Hospital-based	-0.163	0.235	-0.137	0.348
HMO	-0.834 ***	0.000	-0.295	0.128
Medical school	-0.132	0.433	-0.316 **	0.045
Other	-0.465 ***	0.005	0.167	0.178

Table B6. GLM output for consultations, CPT=99244 (continued)

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Weekly hrs. direct pt. care	0.015 ***	0.000	0.006 **	0.023
Year=2005	0.557 ***	0.000	0.194 **	0.044
Demand shift variables				
Accepts all/most new private pts.	0.011	0.934	0.020	0.879
Treats Medicaid patients	0.199 *	0.064	-0.116	0.320
Mkt. for phys. services very competitive	-0.018	0.854	-0.009	0.901
Cross price term (fee difference per work	0.013	0.611	-0.014	0.422
Ave. prob. Medicare pts. have supple. ins.	3.024 ***	0.000	0.309	0.586
Intercept	-4.836 ***	0.000	2.269 ***	0.000

***p≤0.01; **p≤0.05; *p≤0.10

Table B7. GLM output for electrocardiograms, CPT=93000

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	0.013	0.725	0.049 *	0.076
Physician Characteristics				
Gender=Male	0.415 ***	0.000	0.581 ***	0.000
Years in Practice	-0.004	0.406	0.017 ***	0.000
Int'l. Medical Graduate	-0.091	0.459	-0.117	0.161
Doctor of Osteopathy	-0.478 ***	0.002	-0.274 ***	0.002
Board Certified	0.224	0.166	0.180 **	0.025
Race/Ethnicity (ref. Grp=White)				
Hispanic	0.009	0.970	-0.167	0.298
African American	-0.328 *	0.066	-1.057 ***	0.000
Asian	-0.049	0.744	0.010	0.913
Other Race	-0.287	0.242	0.168	0.432
Race information missing	-0.050	0.885	0.177	0.474
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	-0.598 **	0.017	-0.758 ***	0.000
Family practice	-0.074	0.405	-1.133 ***	0.000
Allergy and immunology	-4.467 ***	0.000	0.235	0.792
Cardiology	2.459 ***	0.000	1.205 ***	0.000
Critical care med.	-0.531 ***	0.000	-0.008	0.951
Endocrinology	-1.494 ***	0.000	-1.001 ***	0.000
Gastroenternology	-3.020 ***	0.000	-1.613 ***	0.000
Infectious diseases	-1.856 ***	0.000	0.525	0.416
Nephrology	-1.023 ***	0.001	-0.202	0.602
Neurology	-4.230 ***	0.000	-1.433 **	0.019
OM/PMR	-3.441 ***	0.000	-3.414 ***	0.000
Oncology	-2.360 ***	0.000	-1.497 ***	0.000
Other med spec	-1.815 **	0.017	-2.524 ***	0.000
Cardio surgery	-3.046 ***	0.000	-2.572 ***	0.000
General surgery	-4.421 ***	0.000	-2.168 ***	0.000
Strong/Mod. Financial incentives (ref. Grp.=	0.511 ***	0.000	0.158 *	0.073
Case mix severity (ave. HCC score)	-0.683 ***	0.000	0.115 *	0.070
Practice type (ref. Grp.=group<4 phys)				
Groups with 4-10 phys.	0.341 **	0.023	0.155 *	0.052
Groups with 11-49 phys.	0.061	0.725	0.215 *	0.094
Groups with 50+ phys.	0.252	0.295	-0.150	0.205
Hospital-based	-0.215	0.158	-0.116	0.269
HMO	-1.315 ***	0.000	-0.534 **	0.030
Medical school	-0.936 ***	0.000	-0.501 ***	0.003
Other	-0.548 ***	0.002	-0.444 ***	0.000
Weekly hrs. direct pt. care	0.012 ***	0.001	0.009 ***	0.000
Year=2005	0.008	0.956	0.207 ***	0.010
Demand shift variables				
Accepts all/most new private pts.	-0.154	0.186	-0.200 **	0.012
Treats Medicaid patients	0.059	0.636	-0.094	0.229
Mkt. for phys. services very competitive	0.241 **	0.050	-0.040	0.548
Cross price term (fee difference per work	0.028 **	0.048	-0.007	0.627
Ave. prob. Medicare pts. have supple. ins	2.613 ***	0.000	0.366	0.525
Intercept	-0.779	0.124	2.584 ***	0.000

***p≤0.01; **p≤0.05; *p≤0.10

Table B8. GLM output for echocardiograms

Independent variable	Probability of providing		Number of services provided,	
	Coefficient	P-value	Coefficient	P-value
Medicare Fee Difference	0.005	0.235	0.007 *	0.065
Physician Characteristics				
Gender=Male	0.684 ***	0.000	0.572 ***	0.001
Years in Practice	0.013 *	0.058	0.009	0.157
Int'l. Medical Graduate	0.613 ***	0.002	-0.270	0.155
Doctor of Osteopathy	0.494 *	0.073	0.381	0.151
Board Certified	0.524 **	0.044	0.113	0.701
Race/Ethnicity (ref. Grp=White)				
Hispanic	0.062	0.824	0.351	0.106
African American	0.388	0.307	0.500 *	0.093
Asian	-0.411 *	0.086	0.486 **	0.015
Other Race	-0.405	0.261	0.342	0.400
Race information missing	-0.071	0.898	0.511 *	0.091
Specialty (ref. Grp.=Genrl. Internal Med.)				
General practice	-0.911 ***	0.008	0.301	0.734
Family practice	-0.697 ***	0.001	-0.635 ***	0.001
Cardiology	5.127 ***	0.000	1.944 ***	0.000
Critical care med.	-1.910 ***	0.000	-0.383	0.359
Strong/moderate financial incentives	0.259	0.165	-0.123	0.512
Average patient acuity score	-0.221 *	0.066	0.023	0.886
Practice type				
Groups with 4-10 phys.	0.666 ***	0.010	0.187	0.265
Groups with 11-49 phys.	1.014 ***	0.007	-0.085	0.614
Groups with 50+ phys.	0.212	0.633	-0.167	0.475
Hospital-based	-0.688 ***	0.004	0.716	0.124
HMO	-0.145	0.789	0.153	0.575
Medical school	-2.045 ***	0.000	-0.071	0.816
Other	-0.717 **	0.036	1.073 **	0.038
Weekly hrs. direct pt. care	0.006	0.296	0.006	0.271
Year=2005	0.663 **	0.017	0.779 ***	0.003
Demand shift variables				
Accepts all/most new private pts.	0.486 ***	0.009	0.320	0.134
Treats Medicaid patients	-0.021	0.926	-0.158	0.396
Mkt. for phys. services very competitive	-0.131	0.458	0.014	0.923
Cross price term (fee difference per work	-0.023	0.463	0.010	0.586
Ave. prob. Medicare pts. have supple. ins.	-1.336	0.235	3.564 ***	0.001
Intercept	-3.515 ***	0.003	-1.535	0.253

***p≤0.01; **p≤0.05; *p≤0.10