
Allocating Practice Expense Under the Medicare Fee Schedule

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Currently, relative value units for practice expense are determined under the Medicare fee schedule (MFS) using historical physician charges. This seems inconsistent with the goal of a resource-based fee schedule. A specialty resource-based method of determining practice expense payments is presented and simulated here. The method assumes that, for each service, the payment for practice expense should be the same proportion of the total payment as actual physician practice expenses are of total practice revenues. A comparison with the approach developed by the Physician Payment Review Commission (PPRC) shows similar fees, but the specialty-based method proposed here requires no data beyond what is already employed in the MFS.

INTRODUCTION AND BACKGROUND

Many believe that the physician fees that evolved under the customary, prevailing, and reasonable (CPR) payment methodology were distorted by insurance coverage and other factors. Historical CPR physician fees often greatly exceeded the cost of providing services (including a reasonable return to the physician's work), especially for invasive procedures. This

gave inappropriate incentives for the oversupply of services, especially tests and procedures, and in the long run, for oversupply of specialized physicians relative to general practitioners. Historical physician fees have also been regarded as inequitable because the rate of compensation per unit of physician work varied so greatly among services and specialties. Recent reforms of physician payment have emphasized basing fees on resource costs with the twin goals of improving efficiency (i.e., lessening incentives to oversupply certain services) and equity.

A primary goal of the MFS is to bring payments for Medicare physician services more in line with the relative resource cost of providing services. To this end, relative values for physician work were established through surveys of physicians (Becker, Dunn, and Hsiao, 1988). MFS payments for physician work, however, account for only about 54 percent of total MFS payments. The remainder are allocated to practice expenses and malpractice insurance costs. Practice expense—non-physician labor costs, office rental, equipment, supplies, and miscellaneous—accounts for about 41 percent of total payments, and malpractice insurance expense for about 5 percent. The Omnibus Budget and Reconciliation Act of 1989 (OBRA 1989) required the calculation of separate relative value units

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(RVUs) for practice expense and malpractice in addition to physician work.

Practice expense and malpractice RVUs are established by multiplying historical Medicare allowed charges for services by the percentage of total practice revenues accounted for by these costs. Thus, the MFS is a mixture of a resource-based fee schedule (for physician work) and a charge-based fee schedule (for practice expense and malpractice costs). Any benefits from resource-based fees—less incentive to overprovide some services and underprovide others, for example—are attenuated in the MFS.

Recognition that roughly one-half of the MFS is charge-based has stimulated interest in developing resource-based methods for allocating practice expense and malpractice costs. The PPRC has devoted considerable attention to delineating the principles of resource-based allocation of non-physician costs. The PPRC has also evaluated the feasibility of collecting the data necessary to implement a resource-based approach. A recently released report describes the PPRC's approach and results of simulations of resource-based fees with data from one multispecialty clinic (Physician Payment Review Commission, 1992a). In addition, the Leonard Davis Institute at the University of Pennsylvania has suggested an approach to allocating practice expense that focuses on minimizing the incentives facing physicians to provide unnecessary services (Pauly and Wedig, 1991).

Neither the PPRC nor the Pauly and Wedig approach is entirely satisfactory, however, mainly because the information each requires is difficult or expensive to obtain. The PPRC approach requires data on the direct costs of each physician service, which necessitates complex and ex-

pensive surveys, or even time and motion studies, of physician practices. The Pauly and Wedig approach presumes that information on the long-run marginal cost and the sensitivity of supply of physician services to their price is available for each service or class of services.

The approach developed in this article has much lower data requirements than either the PPRC or Pauly and Wedig methods. In fact, it can be implemented using data sources already employed in the MFS. The lesser data requirements of this method mean that it can be developed more rapidly and more cheaply than the other methods, and can be validated and updated more easily. The tradeoffs for the lesser data requirements of the method are that resource costs are determined only at the specialty level, not at a service-specific level, and that prices resulting from the method are not as economically efficient as the Pauly and Wedig approach.

The basic idea of the method is to set practice (and malpractice) expense payments so that they are the same proportion of total payments as practice expenses are of total practice revenues. The method is resource-based because it utilizes cost data from actual physician practices, not historical charges, to determine the practice expense RVUs. Practice expenses as a proportion of practice revenues are readily available by specialty from physician surveys conducted by the American Medical Association or the Health Care Financing Administration (HCFA). This information is already used in the MFS to calculate the practice expense percentages (PEPs) for each service.

The method proposed here is similar to the multiplicative model originally devel-

oped by Hsaio and his collaborators to incorporate practice expenses into a resource-based fee schedule (Becker, Dunn, and Hsaio, 1988). Within specialty, the Hsaio method allocates practice expenses in proportion to physician work. However, we incorporate elements of other approaches into the basic Hsaio framework. The service-specific PEPs employed in the MFS are used rather than specialty PEPs, so that our fees do not differ by specialty. In addition, a method is suggested for incorporating the office or non-office site-of-service differential advocated by the PPRC using specialty practice cost data only.

The multiplicative approach to allocating practice expenses included in Hsaio's original resource-based relative value scale (RBRVS) was criticized by the PPRC, and discarded in favor of the additive approach now utilized. However, it is an empirical question whether the expensive service-specific data collection pursued by the PPRC actually yields very different fees for most services than the specialty-based multiplicative approach. The fact that two-thirds of practice expenses are indirect costs that the PPRC allocates in proportion to physician work and direct costs suggests that the multiplicative method may be a good approximation to the service-specific method for most services. We begin to answer the question of similarity of fees through simulations of alternative fee schedules. It is also unclear whether the Pauly and Wedig approach would yield very different fees from the specialty-based multiplicative approach. There is some evidence (Pope and Burge, 1993) that relatively little overhead remains to be allocated when physician services are priced at long-run mar-

ginal cost. If so, the adjustment of fees for supply elasticities may have little impact.

In the remainder of this article we present approaches to allocating practice expenses in the MFS, we describe the proposed resource-based method of allocating practice expenses and how it compares with other methods, we describe our simulation methods, we present results for fees and Medicare income impacts by specialty, we discuss refinements to the method, in particular an office or non-office site-of-service differential, we identify problems and limitations of the method, and finally we discuss alternative uses for our methodology.

METHODS FOR ALLOCATING PRACTICE EXPENSE

OBRA 1989 Method

The method for calculating the practice expense and malpractice RVUs that is currently employed in the MFS was specified by OBRA 1989. The practice expense RVU for service i is:

$$RVU_{pe,i} = (PEP_i) \cdot (AC_i), \quad (1)$$

where

$$\begin{aligned} PEP_i &= \text{the practice expense percentage for service } i, \text{ and} \\ AC_i &= \text{the allowed charge for service } i \text{ in 1989 aged to 1991.} \end{aligned}$$

The practice expense percentage is

$$PEP_j = \frac{\sum_i (PEP_i) \cdot (PS_{i,j})}{PS_{j,j}}, \quad (2)$$

where

$$PEP_j = \text{the ratio of mean practice expenses to mean total (gross) practice revenue for specialty } j, \text{ and}$$

$PS_{i,j}$ = the proportion of service i provided by specialty j .

For 380 primarily office-based services defined by HCFA, a site-of-service adjustment is made. When the place of service is the hospital outpatient department, the practice expense RVUs are reduced by 50 percent.

PPRC Method

The method PPRC has proposed for allocating practice expense relies on three basic concepts: direct costs, indirect costs, and a site-of-service differential. Direct costs are costs directly attributable to specific services—clinical labor, medical equipment and supplies, and a constant billing cost. Indirect costs are overhead costs that are difficult to assign to specific services—office space and equipment, administrative labor, and miscellaneous.

PPRC has measured direct costs for specific services using data from a large multispecialty clinic (Physician Payment Review Commission, 1992a). Direct cost relative values are calculated based on these data. Actual MFS payments are determined by assuming that 32 percent of total MFS practice expense payments are to cover direct practice expenses. (The estimate that 32 percent of physician practice expenses are for direct costs is based on *Medical Economics* survey data [Physician Payment Review Commission, 1992a].) Indirect costs—the remaining 68 percent of MFS practice expense payments—are allocated to services in proportion to the sum of physician work and direct costs.

Direct costs are assigned only to office services and global surgical services (with the exception of a constant cost of

billing, which is allocated to all services, and is considered a direct cost). This creates a site-of-service differential—a service is paid at a higher rate when performed in the office than when performed outside the office (such as at a hospital or ambulatory surgery center). The rationale for the site-of-service differential is that physicians incur direct costs only when a service is performed in their office. If it is performed elsewhere, the facility (e.g., hospital) incurs the direct costs and is compensated through Medicare's facility payment. Paying the physician direct costs for non-office services would therefore constitute double payment. The indirect costs of maintaining an office, on the other hand, are incurred by the physician regardless of where services are performed and are therefore assigned proportionately to all services.

Ramsey Pricing

A method of allocating practice expenses derived from the economic theory of Ramsey pricing has been proposed by Pauly and Wedig (1991). This method begins by recognizing that physician fees must be greater than the direct costs of providing services. Price must exceed direct marginal cost because the overhead expenses of running a practice (such as office rent) must be met. It is also assumed that physicians are responsive to financial incentives, and that they face financial incentives to oversupply services. Given this situation, the goal of Medicare or other third-party payers should be to allocate overhead costs among services so as to minimize physician oversupply of services.

This goal implies that more of overhead costs should be allocated to services

whose supply is relatively insensitive to the price that physicians receive for them. Conversely, less of overhead expenses should be allocated to services where physicians may significantly increase supply in response to a higher price. For example, more overhead costs should be loaded onto non-discretionary services such as setting broken arms, and less onto services such as diagnostic and laboratory tests where "inducement," or oversupply, may be a problem. By setting the price for the latter type of services closer to marginal cost, physicians will have less incentive to oversupply them. Although the basic idea of this method is relatively straightforward, its empirical implementation is not. Accurately estimating the long-run marginal cost of services and the sensitivity of physician supply of services to price is difficult.

Hsaio Method

As part of their work on the RBRVS, Hsaio and his collaborators proposed a method of accounting for practice expenses (Becker, Dunn, and Hsaio, 1988). The formula they proposed for resource-based relative values (RBRV) was:

$$RBRV = (TW)(1 + RPC)(1 + AST), \quad (3)$$

where

- TW* = total physician work,
- RPC* = an index of relative specialty practice costs, and
- AST* = an index of amortized value for the opportunity cost of specialty training.

The multiplicative term $1 + RPC = PCF$ (practice cost factor) accounts for practice expenses in the original Hsaio scheme. The practice cost factor, *PCF*, is

the ratio of gross practice revenue to physician net income by specialty. The total payment is thus determined by marking up physician work, the analogue of net income, to yield the fees, the analogue of gross income. Within a specialty, practice costs are allocated in proportion to the total physician work of a service.

The Hsaio multiplicative approach was criticized by the PPRC on several grounds (Physician Payment Review Commission, 1989). First, under the Hsaio approach to practice expense, fees vary by specialty, which the PPRC saw as contrary to the intent of an RBRVS. Second, because practice expenses are not measured for each service, some inaccuracy in allocating expenses across individual services occurs. That is, some services performed by a specialty require greater amounts of practice inputs, such as nurse time and medical supplies, than others. Third, the method imposes a rigid, proportional relationship between practice expense and physician work. If the work RVUs change, then so will the practice expense RVUs. Since practice expense is not necessarily directly related to physician work, this proportional relationship between the two may not be desirable. For example, when the work of an overvalued service is reduced, practice expense payments are also reduced. When the work of an undervalued service is raised, practice expense payments are raised. But actual practice expenses may not have changed.

PROPOSED SPECIALTY RESOURCE-BASED METHOD

The method proposed here starts from the observation that MFS physician fees are composed of two parts: a payment for physician work, and a payment for

practice expense (including malpractice insurance). The method assumes that the payment for practice expense should be the same proportion of the total payment as actual physician practice expenses are of total practice revenues. This is a resource-based method because the practice expense percentage is derived from actual physician practice data on practice expenses as a proportion of total practice revenues. Practice expenses and revenues are calculated practice-wide by specialty, not on a service-specific basis. Thus, the method assumes that the relationship between physician work and practice expense is uniform for all services provided by a specialty.

Specifically, the method sets practice expense RVUs so that they are the same proportion of total RVUs as practice expenses are of total practice revenues:

$$RVU_{pe,i} / TRVU_i = PEP_i \quad (4)$$

where

$TRVU_i$ = total relative value units for service $i = RVU_{w,i} + RVU_{pe,i}$, with $RVU_{w,i}$ denoting the physician work RVU, and $RVU_{pe,i}$ the practice expense RVU (including malpractice) for service i .

Equation (4) can be solved for $RVU_{pe,i}$.

$$RVU_{pe,i} = [PEP_i / (1 - PEP_i)] RVU_{w,i} \quad (5)$$

Equation (5) states that if, for example, practice expenses account for one-half of physician revenues on average for the specialties performing a service (that is $PEP_i = 0.5$), then the practice expense RVUs for that service equal the work RVUs.

Substituting equation (5) into the expression for total RVUs, we have:

$$TRVU_i = [1 / (1 - PEP_i)] RVU_{w,i} \quad (6)$$

PEP_i = service i 's practice expense percentage, that is, the percentage of practice expenses in total revenues for each specialty providing service i , weighted by the specialty's frequency of performing service i .

Multiplied by an appropriate conversion factor and geographic adjustment factor, equation (6) gives the Medicare fee for service i under the proposed method. We call equation (6) a specialty resource-based relative value scale because it is calculated from only $RVU_{w,i}$ and PEP_i , which are both derived from actual physician resource costs by specialty. The percentage markup over physician work for service i implied by equation (6) is:

$$(TRVU_i - RVU_{w,i}) / RVU_{w,i} = PEP_i / (1 - PEP_i) \quad (7)$$

If the practice expense percentage PEP were the same for all services, equation (6) shows that the method would allocate practice expenses in proportion to physician work. Also, the markup over work would be the same for all services (equation 7). However, PEP_i does vary by service, though only according to the mix of specialties performing a service. For example, fees for services performed by psychiatrists are marked up less over physician work than fees for services performed by general practitioners, because psychiatrists have lower practice expenses relative to revenues than do general practitioners. Within a specialty, though, the method presumes that physician work and practice inputs are comple-

mentary; that is, services that require more physician work also require more practice inputs.

In the short run, practice expense percentages are necessarily based on historical practice cost, income, and revenue data that will be altered by the implementation of the MFS. The MFS's revaluation of work will also revalue practice expenses, which was one of PPRC's criticisms of the multiplicative allocation of practice expense. To overcome this limitation, each specialty's historical practice expense percentage could be adjusted for the average percentage revaluation of physician work by the MFS. We have not done so in the simulations reported in this article. Eventually, the PEPs can be updated with new, post-MFS physician survey data. In the long run, the PEPs should reflect the realigned relationship between physician work (income) and practice expenses as the MFS and other resource-based fee schedules are adopted.

Within specialty, the proposed method allocates practice expenses in proportion to physician work. An alternative is to allocate in proportion to physician time. Time has the advantages of being more objective and less subject to physician manipulation (Latimer and Becker, 1992). We believe, however, that practice expenses are likely to be higher for those services characterized by greater work relative to time. The higher work services are generally procedural, and tend to require more supplies, equipment, and aides. In any case, work and time are highly correlated, so the choice between the two should not have a major influence on simulated fees.

An important addition to the method proposed here is an office or non-office

site-of-service differential, which is discussed in a later section.

Relationship to Hsaio and PPRC Methods

If the PEP is redefined from a service-specific to a specialty basis, the method proposed here is equivalent to the practice expense allocation originally proposed by Hsaio. To see this, note that $PEP = PE/GR$ where PE = practice expense, and GR = gross revenue. Then, $1/(1-PEP) = GR/NI$, where NI = physician net income. But GR/NI = Hsaio's practice cost factor, PCF (as previously discussed), so the two formulas are equivalent.

As noted in an earlier section, the PPRC criticized Hsaio's original multiplicative approach to allocating practice expenses, preferring the additive formula that is now used in the MFS. However, one of PPRC's criticisms, that payments would vary by specialty, does not apply to the method simulated in this article. We use the service-specific practice expense percentages developed for the MFS to determine fees, rather than the specialty-specific percentages proposed by Hsaio.

Another of PPRC's criticisms of the Hsaio method, that practice expenses are determined only on a specialty basis and not on a service-specific basis, applies to the method used in this article as well. However, the much greater data requirements and expense of PPRC's service-specific methodology must be weighed against its potentially greater accuracy in measuring practice costs. It is an empirical question whether specialty PEPs can provide an adequate approximation to service-specific costs. PPRC considers about two-thirds of practice expense to

be indirect costs. PPRC allocates indirect costs in proportion to the sum of physician work and direct costs, not unlike what is proposed here. This suggests that the specialty-based multiplicative method and PPRC's method may yield similar results for many services.

Another Interpretation of the Method

There is another interesting interpretation of the method of calculating Medicare fees proposed in this article. It is the limit of a process in which the historical allowed charge used in the OBRA 1989 calculation of practice expense RVUs is iteratively replaced by the MFS fee. The current additive formula for determining total RVUs is:

$$TRVU_i = RVU_{w,i} + RVU_{pe,i} = \frac{RVU_{w,i} + PEP_i(AC_i)}{1 + PEP_i} \quad (8)$$

where

AC_i = the historical allowed charge for service i ,

PEP_i = the practice expense percentage including malpractice expense.

Now replace allowed charges AC_i in equation (8) with total relative value units $TRVU_i$ to obtain:

$$TRVU_i(1) = RVU_{w,i} + PEP_i(TRVU_i). \quad (9)$$

Repeat, replacing $TRVU_i$ with $TRVU_i(1)$ to obtain $TRVU_i(2)$. In the limit L ,¹ $TRVU_i(n) = TRVU_i(n-1)$, implying that

$$TRVU_i(L) = [1/(1 - PEP_i)]RVU_{w,i}. \quad (10)$$

But this is just equation (6), showing that the limit of replacing the historical al-

lowed charge with the MFS fee is the method proposed in this article.

In fact, a charge-based relative value scale (RVS), the current MFS RVS, and the specialty resource-based RVS proposed in this article are all special cases of the following formula, where n counts the iterations in replacing the historical charge with the MFS fee:

$$TRVU_i(n) = (1 - (PEP_i)^{(n+1)})TRVU_i(L) + (PEP_i)^{(n+1)}AC_i \quad (11)$$

When $n = -1$, $TRVU_i(-1) = AC_i$, which is a charge-based RVS. When $n = 0$, $TRVU_i(0) = (1 - PEP_i)TRVU_i(L) + (PEP_i)AC_i = RVU_{w,i} + (PEP_i)AC_i$, which is the current MFS RVS (equation [8]). When $n = \infty$, $TRVU_i(\infty) = TRVU_i(L)$, which is the specialty resource-based method of calculating fees proposed in this article. As we iterate (n increases), we get closer and closer to a specialty resource-based RVS.

The algebraic results of this section have several implications. First, they clearly show that the current MFS is an average of a specialty resource-based and a charge-based RVS. By equation (11), the relative value scale underlying the current MFS equals

$$TRVU_i(0) = \frac{TRVU_i(L) + PEP_i(AC_i)}{1 + PEP_i} \quad (12)$$

This is an average of the specialty resource-based RVS proposed in this article, $TRVU_i(L)$, and a charge-based RVS, AC_i . The weight is the practice expense percentage, PEP_i . Note that the greater is PEP_i , the closer the MFS approaches a charge-based relative value for a service. On average, PEP_i (including malpractice expense) equals about 46 percent. Thus, the current MFS is close to a simple (i.e., unweighted) average of a specialty

¹The iterative process will converge because $PEP < 1$.

resource-based and a charge-based fee schedule.

Second, the results of this section show that the additive and multiplicative formulas for calculating Medicare fees are not as unrelated as might be supposed. The additive formula can be transformed into the multiplicative formula using the iterative method proposed here. Third, the iterative process provides natural intermediate, or blended, steps between the current MFS and the specialty resource-based fee schedule. In addition to simulating the specialty resource-based fee schedule, we simulate the first iteration of the process that defines it. That is, we simulate replacing the historical allowed charge with the current MFS fee in computation of the practice expense relative value units.

SIMULATION METHODS

To determine the impact of the specialty resource-based method of calculating fees, we simulated its effects on Medicare physician fees and incomes. We used two standards of comparison: historical allowed charges and the fully-phased-in MFS. HCFA's public use file (PUF) of physician services provided data for our simulations. Historical 1989 Medicare allowed charges "aged" to 1991, as well as historical service volumes, are available on the PUF. Also, the file contains work, practice expense, and malpractice RVUs from which we calculated MFS fees. Using historical volumes, aggregate payments under the MFS were reduced by 6.5 percent relative to estimated historical expenditures to reflect the 6.5-percent baseline adjustment that HCFA used in computing the MFS.

We calculated a specialty fully resource-based fee schedule (SRBFS) according to equation (6). We did not incorporate malpractice costs into practice expenses, but retained malpractice RVUs based on historical charges. Malpractice accounts for only 5 percent of total RVUs and it can easily be incorporated into the SRBFS in future work. Unfortunately, the *PEP*, necessary to compute the SRBFS are not on the PUF. We obtained the PEPs by inverting equation (1) because the PUF does contain practice expense RVUs and historical allowed charges.² Using our estimated PEPs and the work and malpractice RVUs, we calculated the SRBFS.

We also calculated an adjusted MFS (AMFS) by replacing the historical allowed charge by the post-transition MFS fee in calculation of the practice expense RVU. This fee is given by equation (9) except that malpractice expense is not incorporated into the PEP. The formula we used was:

$$AMFS_i = RVU_{w,i} + RVU_{m,i} + PEP_i(TRVU_i), \quad (13)$$

where $TRVU_i$ = total RVUs under the MFS for service i . As previously discussed, the AMFS can be interpreted as the first iteration of a process beginning with the MFS that in the limit produces the SRBFS. We expect its fees and specialty income redistributions to be intermediate between the MFS and the SRBFS.

Conversion factors for both the SRBFS and the AMFS were determined to be budget neutral with respect to the fully phased-in MFS. Hence, they incorporate

²This procedure did not produce valid PEPs for all services. Details on the specific edits we made to estimate the PEP when our baseline method failed are in an appendix available from the authors.

the MFS's 6.5-percent baseline adjustment from historical charges. No additional volume response by physicians or patients was simulated; we made no attempt to model how physicians or patients would change quantities in response to the fee changes in the SRBFS and the AMFS. HCFA's site-of-service modifier for 380 services was incorporated into the SRBFS and AMFS fees.

In sum, four fee schedules were computed using data from HCFA's PUF: (1) An historical allowed charge fee schedule; (2) the post-transition MFS; (3) an adjusted MFS where the historical charge is replaced by the MFS fee in calculating the practice expense RVU; and (4) the SRBFS, in which practice expense RVUs are the same percentage of total RVUs as physician practice costs are of total practice revenues. The latter three schedules are budget neutral with respect to each other, and 6.5 percent less expensive in aggregate than historical charges assuming no physician or patient volume response to fee changes. Budget neutrality also assumes that all physicians are paid at the fee schedule amounts: No allowance was made for physicians who charge less than Medicare allows, and thus receive less than the fee schedule. Geographic adjustments were ignored for all fee schedules: Only national fees and volumes were considered. All fees were updated by the Medicare update factor of 1.9 percent from 1991 to 1992. Also, all fee schedules are fully implemented (i.e., post-transition).

As a final comparison for fees, we included preliminary service-specific resource-based fees computed by the PPRC according to their method as previously explained (Physician Payment Review Commission, 1992a). The PPRC lists

fees for up to five different site-of-service adjustments.³ We report their fee for the site-of-service that seems most relevant to the service (e.g., office for office visits and non-office for surgeries). Also, we update the 1991 fees they report by 1.9 percent to 1992.

SIMULATION RESULTS

Fees Under Alternative Fee Schedules

Table 1 shows 1992 fees for the 100 highest expenditure⁴ Medicare services under five alternative fee schedules. As is well known, compared with historical allowed charges the MFS raises fees for visits and consultations, while cutting fees for surgery and diagnostic tests. The AMFS and SRBFS amplify this change, as does PPRC's service-specific resource-based fee schedule. As expected, the AMFS fee lies between the MFS fee and the SRBFS fee for (virtually) all services.⁵ For example, an office visit, new patient, code 99203, has a historical allowed charge of \$41, a fully implemented MFS fee of \$53, an AMFS fee of \$59, a SRBFS fee of \$64, and a PPRC fee of \$65. Conversely, Medicare allowed \$2,145 for a total hip replacement (procedure code 27130) historically, but the MFS fee is \$1,638, the AMFS fee is \$1,459, the SRBFS fee is \$1,305, and the PPRC fee is \$1,025.

As is evident from these two services, the fee changes are quite large for many services. Percentage increases or de-

³The five different site-of-service adjustments result from PPRC's office or non-office distinction versus HCFA's outpatient department site-of-service adjustment, which do not totally coincide.

⁴Based on 1989 volumes and 1989 charges "aged" to 1991.

⁵Because of the 6.5-percent baseline adjustment, the AMFS fee is not necessarily between the MFS fee and the SRBFS fee for every service.

Table 1
Fees for Top 100 Medicare Services¹ Under Alternative Fee Schedules: 1992

Service Category and Code	Modifier	Description	Historical Allowed Charge (AC) ²	Simulated MFS ³	Percent Change MFS-AC	Adjusted MFS (AMFS) ⁴	Percent Change AMFS-MFS	Specialty Resource-Based Fee Schedule (SRBFS) ⁵	Percent Change SRBFS-MFS	PPRC Resource-Based Fee Schedule ⁶	Percent Change SRBFS-PPRC
Visits and Consults											
Office Visits:											
99202	—	Office outpatient visit, new	\$34.23	\$39.21	14.5	\$42.06	7.3	\$44.23	12.8	⁷ \$47.84	-7.5
99203	—	Office outpatient visit, new	40.73	52.98	30.1	58.99	11.3	83.53	19.9	⁷ 65.37	-2.8
99204	—	Office outpatient visit, new	61.88	77.53	25.3	85.00	9.6	90.15	16.3	⁷ 90.57	-0.5
99205	—	Office outpatient visit, new	68.43	96.38	40.8	108.90	13.0	117.56	22.0	⁷ 113.79	3.3
99212	—	Office outpatient visit, established	19.95	21.55	8.0	22.71	5.4	23.67	9.8	⁷ 27.09	-12.6
99213	—	Office outpatient visit, established	26.92	29.93	11.2	31.81	6.3	33.25	11.1	⁷ 35.95	-7.5
99214	—	Office outpatient visit, established	39.67	45.50	14.7	48.69	7.0	50.97	12.0	⁷ 52.70	-3.3
99215	—	Office outpatient visit, established	58.43	70.04	19.9	76.04	8.6	80.39	14.8	⁷ 78.26	2.7
Hospital Visits:											
99222	—	Initial hospital care	78.16	90.70	16.0	97.57	7.6	102.66	13.2	⁸ 80.92	26.9
99223	—	Initial hospital care	85.46	114.64	34.1	128.81	12.4	139.63	21.8	⁸ 109.93	27.0
99231	—	Subsequent hospital visit	28.82	30.23	4.9	31.36	3.7	32.08	6.1	⁸ 26.96	19.0
99232	—	Subsequent hospital care	35.06	43.40	23.8	47.52	9.5	50.46	16.3	⁸ 41.76	20.8
99233	—	Subsequent hospital care	48.22	58.37	21.0	63.29	8.4	66.57	14.1	⁸ 55.73	19.5
99238	—	Hospital discharge day	38.96	52.08	33.7	58.63	12.6	63.88	22.6	⁸ 50.46	26.6
Consultations:											
99243	—	Office consultation	73.97	78.12	5.6	80.94	3.6	82.49	5.6	⁷ 86.32	-4.4
99244	—	Office consultation	99.00	109.55	10.7	115.15	5.1	118.37	8.0	⁷ 119.38	-0.8
99245	—	Office consultation	135.71	145.47	7.2	151.13	3.9	154.06	5.9	⁷ 152.22	1.2
99252	—	Initial inpatient consultation	61.16	61.96	1.3	63.26	2.1	63.86	3.1	⁸ 53.58	19.2
99253	—	Initial inpatient consultation	77.22	79.92	3.5	82.20	2.8	83.36	4.3	⁸ 70.03	19.0
99254	—	Initial inpatient consultation	101.61	110.45	8.7	115.35	4.4	118.03	6.9	⁸ 100.57	17.4
99255	—	Initial inpatient consultation	134.40	144.87	7.8	150.77	4.1	153.84	6.2	⁸ 131.69	16.8
99262	—	Follow-up inpatient consultation	37.93	44.60	17.6	47.83	7.2	49.84	11.7	⁸ 43.00	15.9

See footnotes at end of table.

Table 1—Continued
Fees for Top 100 Medicare Services¹ Under Alternative Fee Schedules: 1992

Service Category and Code	Modifier	Description	Historical Allowed Charge (AC) ²	Simulated MFS ³	Percent Change MFS-AC	Adjusted MFS (AMFS) ⁴	Percent Change AMFS-MFS	Specialty Resource-Based Fee Schedule (SRBFS) ⁵	Percent Change SRBFS-MFS	PPRC Resource-Based Fee Schedule ⁶	Percent Change SRBFS-PPRC
Eye Exams:											
92004	—	Eye exam, new patient	43.24	69.74	61.3	82.03	17.6	91.67	31.4	⁷ 88.96	3.0
92012	—	Eye exam, established patient	32.72	40.11	22.6	43.91	9.5	46.76	16.6	⁷ 51.21	-8.7
92014	—	Eye exam, established patient	41.51	51.18	23.3	56.10	9.6	59.75	16.7	⁷ 63.72	-6.2
92083	—	Visual field exams	62.46	43.70	-30.0	36.75	-15.9	30.88	-29.3	⁷ 25.60	20.6
92235	—	Eye exam with photos	123.18	78.12	-36.6	61.53	-21.2	48.54	-37.9	⁷ 83.97	-42.2
Psychotherapy:											
90843	I1	Psychotherapy 20-30 minutes	40.93	44.00	7.5	45.00	2.3	45.16	2.6	⁸ 47.43	-4.8
90843	P1	Psychotherapy 20-30 minutes	38.35	44.00	14.7	45.83	4.2	46.38	5.4	⁸ 47.43	-2.2
90844	I1	Psychotherapy 45-50 minutes	70.70	69.74	-1.3	69.73	0.0	69.36	-0.5	⁸ 73.59	-5.7
90844	P1	Psychotherapy 45-50 minutes	69.26	69.74	0.7	70.11	0.5	69.88	0.2	⁷ 107.52	-35.0
Other:											
99262	—	Emergency department visit	25.37	28.44	12.1	30.51	7.3	32.45	14.1	⁸ 24.48	32.6
99283	—	Emergency department visit	34.13	44.60	30.7	50.38	13.0	55.79	25.1	⁸ 41.34	34.9
99284	—	Emergency department visit	49.10	77.82	58.5	92.41	18.7	105.80	35.9	⁸ 77.97	35.7
99285	—	Emergency department visit	76.62	121.83	59.0	145.19	19.2	167.41	37.4	⁸ 120.28	39.2
99291	—	Critical care, first hour	105.40	123.02	16.7	132.81	8.0	140.36	14.1	⁸ 108.44	29.4
99312	—	Nursing facility care, subsequent	28.83	35.32	22.5	38.90	10.1	41.95	18.8	⁸ 32.77	28.0
99332	—	Rest home visit established patient	25.56	37.72	47.5	43.80	16.1	49.07	30.1	⁸ 38.15	28.6
Pathology											
88304	26	Tissue exam by pathologist	37.58	18.26	-51.4	12.94	-29.1	10.54	-42.3	—	—
88305	26	Tissue exam by pathologist	60.41	41.91	-30.6	37.04	-11.6	34.75	-17.1	—	—
88307	26	Tissue exam by pathologist	86.92	76.63	-11.8	74.26	-3.1	72.85	-4.9	—	—

See footnotes at end of table.

Table 1—Continued
Fees for Top 100 Medicare Services¹ Under Alternative Fee Schedules: 1992

Service Category and Code	Modifier	Description	Historical Allowed Charge (AC) ²	Simulated MFS ³	Percent Change MFS-AC	Adjusted MFS (AMFS) ⁴	Percent Change AMFS-MFS	Specialty Resource-Based Fee Schedule (SRBFS) ⁵	Percent Change SRBFS-MFS	PPRC Resource-Based Fee Schedule ⁶	Percent Change SRBFS-PPRC
Radiology											
70450	26	CAT scan; head or brain	57.18	40.71	-28.8	40.25	-1.1	39.85	-2.1	—	—
70470	26	Contrast CAT scans of head	83.20	60.76	-27.0	60.00	-1.3	59.36	-2.3	—	—
70551	TC	Magnified image, brain (MRI)	449.58	357.99	-20.4	357.77	-0.1	351.69	-1.8	—	—
71010	26	Chest X-ray	11.95	8.38	-29.9	8.36	-0.3	8.30	-0.9	—	—
71020	26	Chest X-ray	14.44	10.18	-29.5	10.06	-1.1	9.96	-2.1	—	—
71020	TC	Chest X-ray	21.85	20.05	-8.2	20.05	0.0	19.81	-1.2	—	—
74160	26	Contrast CAT scan of abdomen	84.40	60.76	-28.0	60.00	-1.3	59.36	-2.3	—	—
76091	26	Mammogram both breasts	26.97	19.46	-27.9	19.27	-0.9	19.10	-1.9	—	—
76091	TC	Mammogram both breasts	46.17	41.61	-9.9	41.51	-0.2	39.63	-4.8	—	—
76700	26	Echo exam of abdomen	54.02	38.31	-29.1	37.78	-1.4	37.36	-2.5	—	—
77407	TC	Radiation treatment delivery	64.17	66.75	4.0	66.64	-0.2	64.39	-3.5	—	—
77412	TC	Radiation treatment delivery	71.80	74.23	3.4	74.27	0.0	74.30	0.1	—	—
77425	26	Weekly radiation therapy	163.45	116.44	-28.8	114.97	-1.3	113.74	-2.3	—	—
77430	26	Weekly radiation therapy	243.85	171.81	-29.5	169.55	-1.3	167.71	-2.4	—	—
78306	26	Nuclear scan of skeleton	57.43	41.31	-28.1	40.73	-1.4	40.27	-2.5	—	—
Surgery											
11700	—	Scraping of 1-5 nails	22.88	20.65	-9.7	20.11	-2.6	19.55	-5.4	^a 16.61	17.7
17000	—	Destruction of facial lesion	34.79	34.42	-1.1	34.80	1.1	34.87	1.3	^a 31.11	12.1
19240	—	Removal of breast	956.43	755.20	-21.0	700.45	-7.2	669.55	-11.3	^a 656.86	1.9
20610	—	Drain/inject joint/bursa	33.61	40.71	21.1	44.47	9.2	47.38	16.4	^a 759.12	-19.9
27130	—	Total hip replacement	2144.52	1636.21	-23.6	1459.20	-10.9	1305.04	-20.3	^a 1024.91	27.3
27236	—	Repair of thigh fracture	1271.80	1065.30	-16.2	999.94	-6.1	941.67	-11.6	^a 771.02	22.1
27244	—	Repair of thigh fracture	1233.01	1052.73	-14.6	998.15	-5.2	949.12	-9.8	^a 789.52	20.2
27447	—	Total knee replacement	2283.91	1753.15	-23.2	1564.12	-10.8	1397.44	-20.3	^a 1100.00	27.0
33207	—	Insertion of heart pacemaker	826.10	555.55	-32.8	470.80	-15.3	419.26	-24.5	^a 400.30	4.7
33511	—	Coronary arteries bypass (2)	2968.29	1994.71	-32.8	1679.76	-15.8	1477.69	-25.9	^a 1338.50	10.4
33512	—	Coronary arteries bypass (3)	3238.31	2148.56	-33.7	1794.67	-16.5	1567.81	-27.0	^a 1422.17	10.2
33513	—	Coronary arteries bypass (4)	3450.13	2285.96	-33.7	1906.68	-16.6	1662.39	-27.3	^a 1490.39	11.5
33514	—	Coronary arteries bypass (5)	3513.87	2360.79	-32.8	1984.51	-15.9	1739.54	-26.3	^a 1548.77	12.3

See footnotes at end of table.

Table 1—Continued
Fees for Top 100 Medicare Services¹ Under Alternative Fee Schedules: 1992

Service Category and Code	Modifier	Description	Historical Allowed Charge (AC) ²	Simulated MFS ³	Percent Change MFS-AC	Adjusted MFS (AMFS) ⁴	Percent Change AMFS-MFS	Specialty Resource-Based Fee Schedule (SRBFS) ⁵	Percent Change SRBFS-MFS	PPRC Resource-Based Fee Schedule ⁶	Percent Change SRBFS-PPRC
35301	—	Rechanneling of artery	1355.50	1055.42	-22.1	968.13	-8.3	914.21	-13.4	^a 859.09	6.4
36830	—	Artery-vein graft	1148.51	681.57	-40.7	543.58	-20.2	471.01	-30.9	^a 440.52	6.9
44140	—	Partial removal of colon	1155.27	897.38	-22.3	826.44	-7.9	786.69	-12.3	^a 778.82	1.0
45385	—	Colonoscopy, lesion removal	556.02	372.96	-32.9	310.27	-16.8	265.90	-28.7	^a 228.33	16.5
47605	—	Removal of gallbladder	815.54	641.46	-21.3	593.58	-7.5	566.26	-11.7	^a 559.71	1.2
49505	—	Repair inguinal hernia	453.85	323.87	-28.6	286.86	-11.4	266.78	-17.6	^a 258.33	3.3
52601	—	Prostatectomy (TURP)	999.15	774.06	-22.5	702.51	-9.2	651.16	-15.9	^a 581.99	11.9
65855	—	Laser surgery of eye	794.37	482.21	-39.3	367.40	-23.8	279.55	-42.0	^a 236.00	18.5
66821	—	Lasering, secondary cataract	526.22	315.49	-40.0	236.03	-25.2	172.69	-45.3	^a 140.00	23.0
66984	—	Remove cataract, insert lens	1367.53	908.16	-33.6	737.70	-18.8	598.82	-34.1	^a 473.96	26.3
67228	—	Treatment of retinal lesion	735.03	516.94	-29.7	439.58	-15.0	379.11	-26.7	^a 308.64	22.8
Diagnostic											
43239	—	Upper GI endoscopy, biopsy	342.12	228.09	-33.3	188.12	-17.5	158.74	-30.4	^a 136.56	16.2
45330	—	Sigmoidoscopy, diagnostic	102.05	75.43	-26.1	66.09	-12.4	58.56	-22.4	^a 49.89	17.4
45378	—	Diagnostic colonoscopy	343.90	271.47	-21.1	239.65	-11.7	216.75	-20.2	^a 175.53	23.5
45380	—	Colonoscopy and biopsy	393.44	284.06	-27.8	247.24	-13.0	220.46	-22.4	^a 188.58	16.9
52000	—	Cystoscopy	114.59	117.17	2.3	116.85	-0.3	116.02	-1.0	^a 115.67	0.3
92982	—	Coronary artery dilation	1460.65	861.76	-41.0	664.46	-22.9	541.16	-37.2	^a 487.71	11.0
93005	—	Electrocardiogram, tracing	15.87	14.37	-9.5	13.92	-3.1	9.48	-34.0	^a 2.93	223.0
93018	—	Cardiovascular stress test	64.11	40.11	-37.4	31.80	-20.7	26.01	-35.2	^a 23.28	11.7
93225	—	Electrocardiogram (ECG) Monitor/recording, 24 hours	111.61	37.72	-66.2	37.67	-0.1	36.82	-2.4	—	—
93227	—	ECG monitor/review, 24 hours	71.13	46.10	-35.2	37.30	-19.1	30.93	-32.9	—	—
93307	26	Echo exam of heart	100.83	52.38	-48.0	35.48	-32.3	24.23	-53.7	—	—
93307	TC	Echo exam of heart	132.40	121.23	-8.4	118.74	-2.0	92.50	-23.7	—	—
93320	26	Doppler echo exam, heart	59.04	35.02	-40.7	26.79	-23.5	21.28	-39.2	—	—
93503	—	Insert/place heart catheter	243.81	162.53	-33.3	139.44	-14.2	127.47	-21.6	^a 134.31	-5.1
93547	26	Heart catheter and angiogram	705.46	419.06	-40.6	323.76	-22.7	263.08	-37.2	^a 224.54	17.2
93549	26	Heart catheter and angiogram	914.78	545.67	-40.3	424.55	-22.2	349.08	-36.0	^a 300.34	16.2

See footnotes at end of table.

Table 1—Continued
Fees for Top 100 Medicare Services¹ Under Alternative Fee Schedules: 1992

Service Category and Code	Modifier	Description	Historical Allowed Charge (AC) ²	Simulated MFS ³	Percent Change MFS-AC	Adjusted MFS (AMFS) ⁴	Percent Change AMFS-MFS	Specialty Resource-Based Fee Schedule (SRBFS) ⁵	Percent Change SRBFS-MFS	PPRC Resource-Based Fee Schedule ⁶	Percent Change SRBFS-PPRC
Other											
90935	—	Hemodialysis, one evaluation	117.70	76.63	-34.9	62.24	-18.8	51.82	-32.4	⁸ 43.93	18.0
90937	—	Hemodialysis, repeated evaluation	230.05	161.04	-30.0	137.09	-14.9	119.18	-26.0	⁹ 97.93	21.7
A2000	—	Manipulation of spine	16.52	20.65	25.1	23.47	13.6	27.24	31.9	⁹ 18.10	50.5

¹Ranked by expenditure based on 1989 volumes and 1989 charges aged to 1991.

²1989 charges aged to 1991, updated by 1.9 percent to 1992.

³Fully implemented (i.e., post-transition) Medicare fee schedule (MFS).

⁴In calculating practice expense relative value units (RVUs), the aged historical allowed charge is replaced with the MFS fee.

⁵Specialty resource-based fee schedule = (RVU(w) + RVU(mp))/(1-PEP), where RVU(w) = work RVU, RVU(mp) = malpractice RVU, and PEP = practice expense percentage.

See text for explanation.

⁶PPRC resource-based fee schedule as discussed in their 1992 Annual Report to Congress. PPRC fees have been updated by 1.9 percent from 1991 to 1992.

⁷PPRC fee is for office site-of-service.

⁸PPRC fee is for non-office site-of-service.

⁹PPRC fee is for non-office service to which the Health Care Financing Administration's (HCFA) outpatient department adjustment applies.

NOTES: Modifiers—26 is professional component; TC is technical component; I1 is psychiatric codes for inpatient place of service; and P1 is psychiatric codes for non-inpatient place of service. Simulated fees are budget neutral with respect to 1991 aged allowed charges updated by 1.9 percent to 1992, with a 6.5-percent baseline adjustment reduction relative to historical charges, are based on fully phased-in fee schedules, and assume that all physicians are paid at fee schedule amounts. PPRC is Physician Payment Review Commission. PEP is practice expense percentage. CAT is computerized axial tomography.

SOURCES: Center for Health Economics Research calculations using HCFA's Public Use File of Physician Services. PPRC fees: *Practice Expenses Under the Medicare Fee Schedule: A Resource-Based Approach*. Technical Report No. 92-1, Appendix B.

creases between the MFS and the SRBFS of 20 percent or more are not uncommon. Using equation (11), it is easy to derive the exact difference between the MFS and the SRBFS,

$$MFS_i - SRBFS_i = \frac{PEP_i(0.939(AC_i) - SRBFS_i)}{PEP_i} \quad (14)$$

and the percentage difference,

$$\frac{(MFS_i - SRBFS_i)/SRBFS_i}{PEP_i/[(0.939(AC_i) - SRBFS_i)/SRBFS_i]} = \frac{PEP_i[\text{percent difference } (0.939(AC_i), SRBFS_i)]}{PEP_i} \quad (15)$$

where

i indexes particular services, and allowed charges are reduced by 0.939 (= 1/1.065) to account for the 6.5-percent baseline adjustment to the other fee schedules.

Because the PEP is about 41 percent on average, excluding malpractice, equations (14) and (15) imply that the difference between the MFS and the SRBFS is about 40 percent, on average, of the difference between historical allowed charges and the SRBFS. The other 60 percent of the difference between charges and the SRBFS occurs in the transition between charges and the MFS. Because the MFS is a mixture of resource- and charge-based fee schedules, it is not surprising that it makes only part of the transition from historical charges to a resource-based fee schedule. About 54 percent of the MFS, the physician work component, is resource-based, but the other 46 percent, the practice expense and malpractice insurance components, are still charge-based.

The relationship between the specialty-level SRBFS and the service-specific PPRC fee schedule is of considerable interest because both are resource-based.

The two fees are quite similar for many, although not all, office services. In particular, with one exception, the SRBFS and PPRC fees differ by less than 8 percent for all office visits and consultation codes. They are clearly more similar to each other than to historical allowed charges or to the MFS for most office services. Several office services where the two fees differ substantially—eye exam with photos (code 92235) and drain-inject joint-bursa (code 20610)—result from high service-specific direct costs not accounted for in the SRBFS (Physician Payment Review Commission, 1992a).

In contrast to office services, the SRBFS fees for services typically performed in the hospital are usually significantly larger than PPRC's fees. Hospital visit fees, for example, range from 19 to 27 percent larger, and many surgical fees are 10 to 20 percent higher. The reason for the similarity of the office service fees, but dissimilarity of the hospital service fees, appears to be PPRC's office or non-office site-of-service differential. PPRC does not allocate clinical labor or medical equipment and supplies costs to non-office services (except partially to global surgical services). These direct costs account for about one-third of total practice expense, for all specialties. With about 40 percent of the Medicare fee paying for practice costs, PPRC's site-of-service differential implies about a 13-percent reduction in non-office fees, on average.

With a site-of-service differential of this magnitude, the SRBFS hospital surgery or visit fees would be much more similar to the PPRC fees.⁶ As discussed earlier,

⁶The SRBFS as reported in Table 1 does incorporate HCFA's site-of-service (SS) modifier for 380 services through the SS modifier code. However, it has no general office or non-office site differential.

we propose an office or non-office site-of-service differential for the SRBFS using information on the proportion of direct costs in total practice expense by specialty. Table 1 suggests that with an office or non-office site-of-service differential, the SRBFS and the PPRC resource-based fee schedule are similar for many services. Some implications of this similarity have been previously discussed.

As shown in Table 1, the SRBFS and the AMFS radiology fees are quite similar to the MFS fees. This occurs because of the way the MFS radiology fees were calculated from the pre-existing radiology fee schedule (*Federal Register*, 1991) and the method we used to compute the SRBFS.⁷ If resource-based malpractice RVUs are incorporated into the SRBFS, it will be impossible to compute SRBFS fees for the technical component of services which have no work RVUs.

Medicare Income Impacts by Specialty

Table 2 shows simulated changes in Medicare income by specialty when historical allowed charges are replaced by the MFS, AMFS, or SRBFS. The impacts are graphed for selected specialties in Figure 1. (PUF does not contain information for anesthesia services. Therefore, the income redistributions for anesthesiologists reported in Tables 2 and 3 and Figures 1 and 2 pertain to income from

non-anesthesia services billed by anesthesiologists.) It is important to remember that the simulations incorporate the MFS's 6.5-percent baseline adjustment reduction relative to historical allowed charges, and that they assume no volume response by physicians or patients to changes in relative fees. If there is a volume response, the impacts can still be interpreted as the change in payments per service (for the historical mix of services), but they will not accurately indicate the change in total Medicare income.

The AMFS and SRBFS amplify the income redistributions of the MFS. Specialties oriented toward visits and consultations gain, and procedure-oriented specialties lose. The income gain or loss from the SRBFS is roughly 50 percent greater than the income change from the MFS. The income redistribution from the AMFS is approximately halfway between the MFS and SRBFS. The income redistributions are substantial. For example, general practice gains 29 percent from the MFS, 39 percent from the AMFS, and 47 percent from the SRBFS. Conversely, general surgery loses 14 percent from the MFS, 18 percent from the AMFS, and 20 percent from the SRBFS.

The biggest winners among physician specialties from the SRBFS are general practice (+ 47 percent), family practice (+ 46 percent), and internal medicine (+ 12 percent). The non-physician specialties of chiropractic (+ 65 percent), optometry (+ 65 percent), and podiatry (+ 20 percent) are also big winners. The biggest losers are thoracic surgery (- 42 percent), pathology (- 36 percent), ophthalmology (- 36 percent), neurological surgery (- 28 percent), and gastroenterology (- 28 percent).

⁷For technical components of services, which have zero work RVUs, we used 1 over 1 minus the MFS practice expense percentage of 0.941 (*Federal Register*, 1991) to inflate malpractice RVUs to equal the SRBFS. However, because HCFA used the factor 0.941 to divide radiology fee schedule RVUs between practice and malpractice expense, our procedure also reproduces the MFS fee. The MFS and SRBFS fees for professional components are similar for essentially the same reason, because HCFA used the same PEP (= 0.296) to divide the radiology fee schedule RVUs as we used to calculate the SRBFS fees.

Table 3 and Figure 2 display the redistributions from the AMFS and SRBFS, but now relative to the MFS rather than historical allowed charges. The magnitude of the redistributions compared with the MFS is much smaller than that compared with historical charges, but is still significant. From the SRBFS, general and family practitioners gain 14 percent and 12 percent respectively, and internists, 8 percent. Thoracic surgeons lose 19 percent, ophthalmologists 17 percent, patholo-

gists 13 percent, neurosurgeons 11 percent, and gastroenterologists 10 percent. These redistributions are similar to those reported by PPRC for their resource-based fee schedule (Physician Payment Review Commission, 1992a). The biggest differences are that PPRC reports a 24-percent gain for dermatology whereas we simulate only a 2-percent gain, and PPRC reports a 13-percent loss for orthopedic surgery whereas we simulate a 7-percent loss.

Table 2
Impact of Alternative Physician Fee Schedules Relative to Historical Allowed Charges, by Specialty

Specialty	Percent Change in Payments (Per Service)		
	Medicare Fee Schedule (MFS)	Adjusted Medicare Fee Schedule (AMFS) ¹	Specialty Resource-Based Fee Schedule (SRBFS) ²
All Specialties	-6.5	-6.5	-6.5
Family Practice	30.9	39.8	46.4
General Practice	28.7	38.6	46.7
Cardiovascular Disease	-13.7	-16.9	-20.3
Dermatology	-1.4	0.2	0.8
Internal Medicine	3.5	8.5	11.9
Gastroenterology	-19.6	-24.1	-27.5
Nephrology	-11.1	-10.9	-11.0
Neurology	-5.9	-3.4	-2.7
Psychiatry	0.8	4.4	6.1
Pulmonary Disease	-4.4	-1.1	0.5
Urology	-8.8	-10.8	-12.2
Radiology	-23.6	-24.4	-25.5
Anesthesiology	-12.1	-16.3	-18.4
Pathology	-26.2	-32.6	-35.6
General Surgery	-13.5	-17.9	-19.9
Neurological Surgery	-18.9	-24.3	-27.8
Ophthalmology	-22.4	-29.7	-35.5
Orthopedic Surgery	-11.3	-14.8	-17.3
Otolaryngology	1.8	3.0	2.0
Plastic Surgery	-13.8	-16.4	-18.0
Thoracic Surgery	-28.0	-37.2	-41.9
Clinic or Group Practice	1.3	4.5	7.4
Optometry	42.2	55.0	64.6
Chiropractor, Licensed	25.0	42.0	64.8
Podiatry	10.1	16.0	20.1

¹Adjusted MFS replaces historical allowed charge with MFS fee in calculation of practice expense relative value unit (RVU).

²Specialty resource-based fee schedule = $(RVU(w) + RVU(mp))(1-PEP)$, where $RVU(w)$ = work RVU, $RVU(mp)$ = malpractice RVU, and PEP = practice expense percentage.

NOTES: Simulated payments are calculated assuming no volume response by physicians; are budget neutral with respect to 1991 aged allowed charges updated by 1.9 percent to 1992, with a 6.5-percent baseline adjustment reduction relative to historical charges; are based on fully phased-in fee schedules and assume that all physicians are paid at fee schedule amounts. PEP is practice expense percentage.

SOURCE: Center for Health Economics Research calculations using Health Care Financing Administration's Public Use File of Physician Services.

REFINEMENTS TO THE SPECIALTY RESOURCE-BASED METHOD

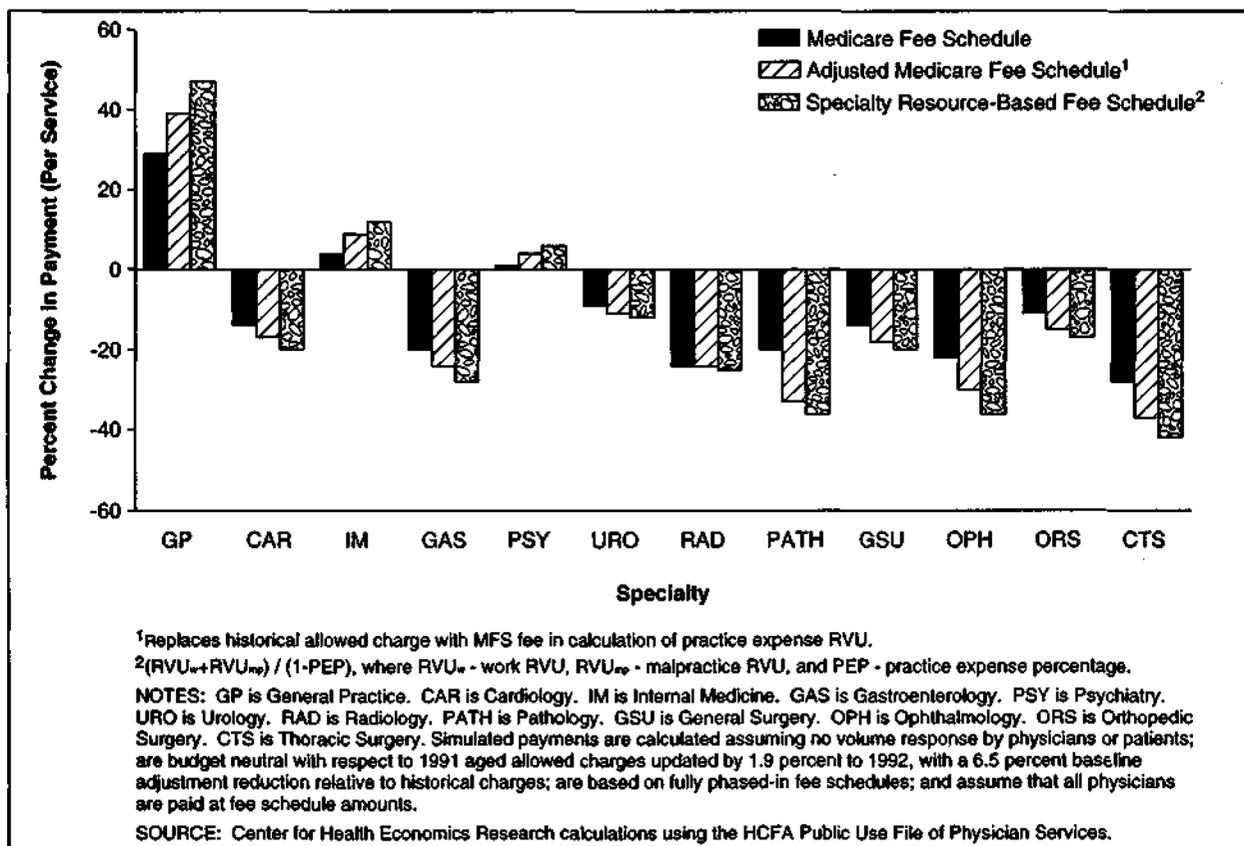
Two major refinements would improve the resource-based methodology presented in the simulations. The first is changing the charge-based allocation of malpractice insurance expenses to a resource-based allocation. This can be accomplished by simply adding the malpractice expense percentage to the practice expense percentage in calculating the specialty SRBFS. Once this change is made, malpractice expense is allocated in the same manner as practice expenses. Although desirable, changing the allocation of malpractice expense would

not have a large effect on the results presented here because malpractice premiums account for only about 5 percent of physician gross revenues, on average.

The second refinement is implementing an office or non-office site-of-service differential. This change would have a greater effect on fees. The rationale for this differential is that the physician incurs direct practice expenses only for services provided in the office. For non-office services, the facility payment to the hospital, ambulatory surgery center, etc., covers the direct non-physician costs associated with the service. HCFA has implemented reduced payments to physicians for services provided in hospi-

Figure 1

Impact of Alternative Physician Fee Schedules Relative to Historical Allowed Charges, by Selected Specialties



tal outpatient departments but not in other non-office settings. We feel that the office or non-office distinction is the appropriate one, so we propose an office or non-office differential analogous to the one developed by the PPRC (as previously noted), but using only specialty, not service-specific, cost data. PPRC's site-of-service differential assigns indirect and billing costs to all services, but the direct costs of clinical labor, medical supplies, and medical equipment are assigned only to office and (partially) non-office global services. PPRC assigns direct costs to non-office global services

only according to their "office percentage" (Physician Payment Review Commission, 1992a). Direct costs are not allocated to non-office, non-global services.

Implementing the office or non-office differential requires distinguishing clinical labor, medical supplies, and medical equipment costs from all other practice costs. PPRC measured direct costs for many services using data from a large, multispecialty clinic. We propose instead to use nationally-representative physician survey data to measure direct costs by specialty. PPRC's classification of office versus non-office costs could be refined.

Table 3
Impact of Alternative Physician Fee Schedules Relative to the Medicare Fee Schedule, by Specialty

Specialty	Percent Change in Payments (Per Service)	
	Adjusted Medicare Fee Schedule (AMFS) ¹	Specialty Resource-Based Fee Schedule (SRBFS) ²
All Specialties	0.0	0.0
Family Practice	6.8	11.9
General Practice	7.7	14.0
Cardiovascular Disease	-3.8	-7.6
Dermatology	1.6	2.2
Internal Medicine	4.8	8.1
Gastroenterology	-5.5	-9.7
Nephrology	0.2	0.0
Neurology	2.7	3.4
Psychiatry	3.5	5.2
Pulmonary Disease	3.4	5.1
Urology	-2.3	-3.7
Radiology	-1.0	-2.4
Anesthesiology	-4.8	-7.1
Pathology	-8.6	-12.8
General Surgery	-5.2	-7.4
Neurological Surgery	-6.7	-11.0
Ophthalmology	-9.4	-16.8
Orthopedic Surgery	-3.9	-6.8
Otolaryngology	1.2	0.3
Plastic Surgery	-2.9	-4.8
Thoracic Surgery	-12.7	-19.3
Clinic or Group Practice	3.2	6.0
Optometry	9.0	15.8
Chiropractor, Licensed	13.6	31.8
Podiatry	5.4	9.1

¹Adjusted MFS replaces historical allowed charge with MFS fee in calculation of practice expense RVU.

²Specialty resource-based fee schedule = (RVU(w) + RVU(mp))(1-PEP), where RVU(w) = work RVU, RVU(mp) = malpractice RVU, and PEP = practice expense percentage.

NOTES: Simulated payments are calculated assuming no volume response by physicians; are budget neutral; are based on fully phased-in fee schedules; and assume that all physicians are paid at fee schedule amounts.

SOURCE: Center for Health Economics Research calculations using the Health Care Financing Administration's Public Use File of Physician Services.

For example, PPRC considers all office space costs indirect and allocates them across all services. However, some office space is devoted to administrative functions necessary for all services, whereas other space is used to provide in-office clinical services. Office space costs could be decomposed into administrative and clinical components, perhaps based on the proportion of administrative versus clinical personnel. The administrative components would be allocated across all services, but the clinical component would be allocated only to office services.

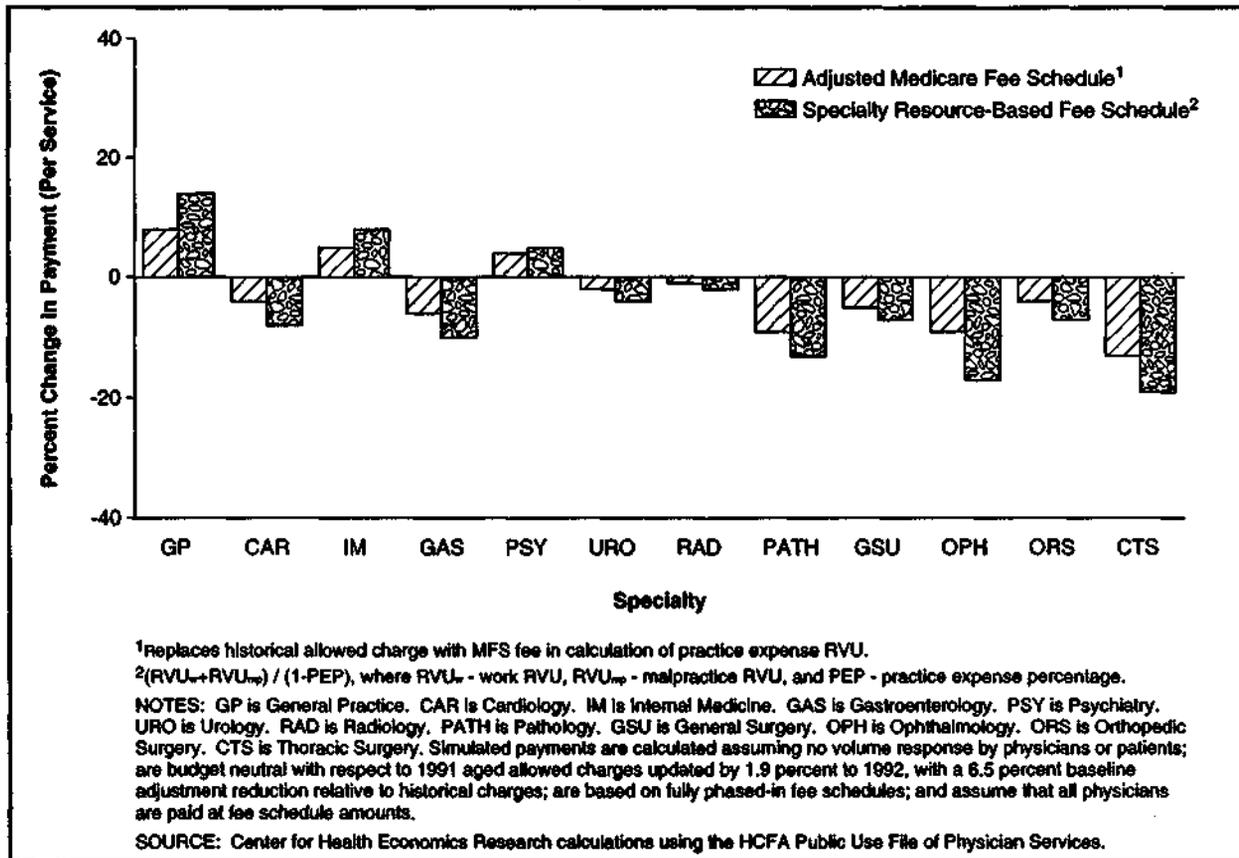
HCFA's Physician Practice Costs and Income Survey and the American Medical Association's Socioeconomic Monitoring

System Survey collect costs for medical equipment and supplies by specialty. They also obtain expenditures for non-physician labor. Labor expenses are not categorized into clinical versus administrative. However, both surveys collect full-time equivalent counts of administrative and clinical practice personnel. With national (or regional) relative wage rates for the two categories of personnel, labor expenditures can be decomposed into clinical versus other (Welch, Zuckerman, and Pope, 1989).

Costs for clinical labor and medical supplies and equipment can be expressed as a percentage of total practice expense for each specialty. Using relative

Figure 2

Impact of Alternative Physician Fee Schedules Relative to the Medicare Fee Schedule, by Selected Specialties



frequencies of service by specialty, an appropriate percentage reduction in practice expense RVUs for non-office sites-of-service can be computed for each service. (The same frequencies used to calculate the MFS practice expense percentages can be used. Also, PPRC's global office percentages by service can be used to partially allocate direct office expenses to global non-office services [Physician Payment Review Commission, 1992a].) Budget neutrality would be based on national frequencies of service in office or non-office sites from HCFA's Part B Medicare Annual Data files.

A Site-of-Service Differential: Example

Consider the service initial hospital care, code 99222. The specialty resource-based fee is \$103 versus PPRC's fee, with non-office site differential, of \$81 (Table 1). If, for example, the practice expense percentage for this service is 40 percent, then about \$41 of the fee is allocated to practice expense. Suppose further that the average proportion of clinical labor, medical supplies, and medical equipment costs in practice expenses for specialties performing this service is one-third; then the practice expense payment of \$41 should be reduced by one-third, or about \$13.50, for a non-office service. Our resource-based fee with site adjustment is then about \$89.50, which is much more similar to PPRC's fee. Although this example is only approximate, it gives an idea of the significant effect that a site-of-service differential has on non-office fees.

LIMITATIONS OF THE SPECIALTY RESOURCE-BASED METHOD

The resource-based method for allocating practice expense proposed in this arti-

cle has three major limitations. First, because it is based on specialty rather than service-specific practice costs, it may pay inappropriately for services that have atypically high or low direct costs. Essentially, we assume that the proportion of practice expense to work is constant for services provided by a specialty, which may not be reasonable for some services. For example, some services require use of expensive equipment or supplies such as pharmaceuticals or photographic film. According to PPRC's data, eye exam with photos (code 92235 in Table 1) is an example of a service with atypically high direct costs. It seems to be substantially underpaid by our methodology. In the end, there is no substitute for measuring direct costs for individual services. However, we have argued that our method, at much less expense, appears to provide a good approximation to fees based on service-specific cost measurement for many services.

Second, our method cannot be used to determine fees for services that have no physician work values. In particular, the method breaks down for technical components of radiology or other test fees. Some other approach must be employed for these services.

Third, our method takes no account of the supply response of physicians to changes in their fees. Our method is resource-based, and is consistent with PPRC's principle of "incentive neutrality" (Physician Payment Review Commission, 1992a). (By incentive neutrality, PPRC means that indirect costs are allocated proportionately to physician work costs, so that there is no apparent incentive for physicians to provide one service versus another.) However, as Pauly and Wedig have pointed out, PPRC's method may

not, in fact, be incentive-neutral because physicians may have different propensities to change their supply of different types of services as service price changes (Pauly and Wedig, 1991). An optimal payment system would take account of physician supply behavior in setting fees. Unfortunately, measuring the necessary supply elasticities is difficult.

CONCLUSIONS

In this article, we have presented and simulated a specialty resource-based method for allocating practice expense under the MFS. The method could be used to replace the current charge-based allocation of such expenses, which seems inconsistent with the goals of the MFS. We compared our simulated specialty resource-based fees with the preliminary service-specific resource-based fees developed by the PPRC. The two fees are similar for many high-volume office services, and with an office or non-office site-of-service differential, it appears that they would be similar for many non-office services as well. However, our method requires no data beyond what are already used in the MFS, whereas expensive surveys of physician practices must be undertaken to implement PPRC's approach.

Our resource-based fees could be used in the following ways:

- To implement a specialty resource-based fee schedule. Although in theory our fees are not as accurate in measuring resource costs as those of a service-specific approach, they are much closer to a fully resource-based fee schedule than the current MFS. If a fully resource-based fee schedule is the goal, implementing our fees would

seem to be a preferable to continuing the current MFS because the data requirements of a service-specific approach are too stringent. To be sure, if gathering the data to implement a service-specific method is feasible, that may be the best approach to pursue.

- To validate fees derived from a service-specific approach. Because gathering the data for a service-specific method is expensive, data may be obtained from only a small number of practices. In contrast, the physician practice cost and revenue data used in our method are gathered from nationally representative samples of physicians. Practice organizations used in different regions of the country, urban and rural settings, solo versus group practices, and single versus multispecialty practices are all represented in our data. Thus, our fees could serve as a broad-based validity check on the fees derived from a service-specific approach. Using our method, different fees could even be calculated to reflect different practice organizations (e.g., different practice expense shares by urban-rural location or by solo versus group practice).
- To fill in fees for less frequently performed services in a service-specific approach. Because of the expense of gathering direct costs for individual services, obtaining them for only the highest volume or expenditure Medicare services may be cost effective. Our method could be used to fill in fees for the many thousands of less frequently performed services. In most cases, our method should provide a good approximation to the fees that would be obtained from collecting direct cost data.

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