

Physician losses from Medicare and Medicaid discounts: How real are they?

by Jerry Cromwell and Philip Burstein

Physicians' claims that extensive Medicare and Medicaid fee discounting imposes an inequitable burden on them are examined using survey data from the Health Care Financing Administration on 5,000 primary care physicians. A definite fee hierarchy is documented, with the physician's usual charge at the top and Medicare and Medicaid allowables at the bottom. Under usual, customary, and reasonable methods, physicians can use fees to maximize pay-

ment, and insurer attempts to control fees result in both sides participating in a revenue maximization-expenditure control game. Raising Medicare and Medicaid allowables to the physician's usual fee is shown to result in large windfall gains that are unnecessary and unjustified in terms of work effort, human capital investment, or eliciting an adequate supply of practitioners.

Introduction

Both Medicare and Medicaid reimburse physicians at rates below their stated usual fees, so that practitioners who see large numbers of the poor and elderly claim to do so at severe financial risk. The following lamentations of three California physicians are typical (Jones and Hamburger, 1976):

"I adjusted my accounts down over \$900 on my usual and customary fees in January 1975; these were all Medi-Cal patients." (a Los Angeles orthopedic surgeon)

"[My] professional responsibility is increasing relative to my patients [yet] the financial return is getting less and less for my efforts at patient care. I receive approximately 60 cents return for every \$1 billed for Medi-Cal patients, with no increase in my fees in 5 years." (a San Francisco neurosurgeon)

"I would be glad to do the paperwork, carry the accounts receivable (often 9 to 12 months) if my secretary's time were reimbursed and my usual and customary fees were paid. But \$6 for an office visit and \$7 for a 2 a.m. emergency room visit is ridiculous if the patient takes more than 3 to 5 minutes of my time." (a Los Angeles internist).

Even allowing for exaggeration (actually paying an internist \$6 for a 3-5 minute office visit works out to \$72-\$120 an hour), there is every reason to believe that physicians only rarely receive their usual charge in serving public benefits patients. Medicare regulations, in fact, require that allowables be no higher than those of the carrier, and recent changes in the rules—such as constraining allowables to the Medicare Economic Index and the current freeze on physician fees—have certainly increased the disparity between usual fees and public reimbursement rates.

Whether public fees are in fact significantly lower than usual fees is an empirical question. Often what sticks in the physician's mind is the exceptional case of "a friend of a colleague" who receives only one-third of his usual fee or some ludicrously small

amount such as \$3-\$5 for a lengthy visit. Forgotten are all the times physicians receive a high percentage of their charge for treating the poor or elderly, not to mention what they would have received from these patients without any Medicare or Medicaid program.

Let us suppose that public fees are quite a bit lower than physicians' usual fees. Are they out of line with what other insurers pay, or do physicians experience significant fee reductions across the board? Medicare and Medicaid may not be alone in discounting fees if other third-party payers also feel that physicians' usual fees are excessive. And what about bad debts? If, as physicians claim, these are a high percentage of patient bills, then usual fees may not be usual in terms of net payments.

Another interesting empirical question involves the link between charges, Medicare and Medicaid payments, and net incomes. There are at least two good reasons why low public-reimbursement rates may not translate into dramatically lower net incomes. First, only a fraction of a physician's caseload is normally devoted to public benefits patients. Where public participation on the physician's part is limited, the impact of Medicare and Medicaid fee reductions on income should be minimal. Second, if physician supply or work effort is actually backward-bending, then higher payments would only result in fewer patients visits (operations) as physicians achieve desirable incomes with less effort. In such a situation, Medicare and Medicaid fee reductions could improve patient access while having little effect on physician incomes.

In this article, the following four broad questions concerned with the extent of physician losses (if any) under Medicare and Medicaid are addressed:

- Does a rigid fee hierarchy in fact exist, with usual charges at the top and Medicare and Medicaid payment rates at the bottom?
- If such a fee hierarchy is found to exist, what implications does it have for the average payment received by physicians and the independent validity of usual fees in a heavily insured market?
- Furthermore, what relationship is there between the extent of Medicare and/or Medicaid participation by physicians and their reported net incomes? Are

This report was funded by the Health Care Financing Administration (Grant No. 18-P-97723/V01).
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incomes as low as would be predicted by the difference between usual fees and Medicare and/or Medicaid payments? If not, why?

What would happen to physicians' incomes in the short run if Medicare and/or Medicaid actually raised their payments to what the physicians say they usually charge or what other insurers pay?

Data sources

The primary data source for this study was the 1976-77 National Opinion Research Center (NORC) physician surveys funded by the Health Care Financing Administration. Each was a nationally representative sample of physicians in 15 specialties. Of these, we concentrated on the following five largest specialty groups that are significantly involved in primary care: general practitioners (GP's), general surgeons, internists, obstetricians-gynecologists (OB-GYN's), and pediatricians. All office-based, fee-for-service, salaried, or prepaid group practice physicians who practice in groups with nine or fewer self-employed physicians were included in the sample frame.

Original sample sizes (unweighted) for the 2 years combined were 1,087, 930, 834, 1,047, and 923, respectively. Actual samples varied by analysis because of unreported or erroneous responses. Weighting from disproportionate sampling also altered the number of observations available for analysis.

Measurement error might occur if physicians refused to participate in the survey or if they reported inaccurate information. Extensive analysis of the 1975 NORC survey found no evidence of measurement error in general (Sloan, Cromwell, and Mitchell, 1978).

Variables of key interest in this article include reported gross and net incomes, fees for selected visits and procedures, workloads and hours, insurance coverage, and practice costs, all of which tend to be less accurately reported than other data in the NORC survey. Although there was a 20-percent nonresponse rate for income data, actual reported information was quite close to the American Medical Association figures, i.e., usually within 5 percent. Regressions were used to replace missing values (Technical note).

A major problem with the reported income data occurs when attempting to reconcile net and gross incomes, adjusting for costs. Many physicians reported gross incomes and individual costs that produced an estimated net income much higher or lower than the net income reported elsewhere in the NORC survey. Reconciliation algorithms were used to narrow the difference, and remaining outliers were then omitted.

Physicians were asked to state their usual fee for a followup office and hospital visit as well as for one or two specialty-specific procedures (e.g., an electrocardiogram for an internist). In addition, they were asked to report how much Medicaid, Blue Shield, Medicare, and the major commercial insurer in their area paid them for the same visit or procedure. Physicians were not able to give a fee in a number of

instances, either because they had no patients with a particular type of insurance plan (e.g., Medicaid), or they did not perform the procedure (e.g., a diagnostic dilation and curettage), or the plan did not pay for the service (e.g., Blue Shield does not pay for routine office visits). Because of lower response rates to the question about Medicaid and Blue Shield fees, we replaced missing data with statewide Medicaid or Blue Shield averages.

The intent of the fee question was to determine how much insurers were allowing *in toto* for a service, including any patient deductibles and copays. It is not clear from the responses, however, how many physicians misinterpreted the question to mean how much Blue Shield or Medicare paid versus what the patient paid for the service. Thus, some unknown downward bias in insurer allowables exists, resulting in an overstatement of Medicare and Blue Shield fee discounting. Presumably Medicaid is unaffected because patients have no out-of-pocket expenses (Ferry et al., 1980).

Finally, these reported fees by now are fairly dated. The Health Care Financing Administration conducted a new physician survey in the fall of 1984. To the extent that Medicare and Medicaid price controls have been applied more vigorously than elsewhere, the fee hierarchy will understate the amount of public discounting in today's market.

Physicians were also asked to estimate what percentage of their patients had no insurance coverage, Blue Shield, Medicaid, Medicare, or other private insurance plans. They were also asked what percentage of Medicare patients had supplementary private or Medicaid coverage. With overlapping insurance, most physicians report more than 100-percent insurance coverage, necessitating certain adjustments, described in the following discussion.

Fee reductions of public and private insurers

The focus in this section is on the theory and findings regarding physician participation in Medicare and Medicaid, and the impact of this participation on their average fees and their gross and net incomes. First, the relationship between public and private fees are shown by comparing self-reported usual fees with those of third-party payers, including Blue Shield, commercials, Medicare, and Medicaid. Second, this is followed by a discussion of the role of usual fees in a heavily insured market like that of physician services.

Comparison of public versus private fees

Reported usual fees and insurers' allowables for routine office and hospital followup visits and two specialized procedures by specialty are shown in Table 1. No special procedure fees were asked for GP's, and no procedure fees are shown for all physicians together because of the incomparable nature of the procedures. Although the analysis is based on a limited number of office visits and surgical proce-

dures, the relative discounting is fairly consistent across most other procedures. All fees are regionally adjusted for cost of living and are in 1977 dollars, explaining why many seem to be low by today's standards.

A strong fee hierarchy is clearly evident from the data, with usual fees the highest and Medicare and Medicaid fees the lowest. Commercial insurers tend to come closest to matching the physician's usual fee although the average reduction is still large—30 percent for office fees (\$10.37 and \$14.80, respectively); 20 percent for hospital visits (\$14.29 and \$17.79, respectively). Even though Blue Shield appears to pay more for a routine office visit than commercial insurers (\$12.97 compared with \$10.37), it covers such visits far less frequently. Only 1,600 physicians reported a Blue shield office payment, compared with 2,600 reporting commercial fees and 4,000 reporting usual fees. As all payers generally cover inpatient hospital and specialized procedures, these fees are

probably more representative of the fee hierarchy. Blue Shield reportedly reduced inpatient physician fees 22 percent in 1977, which is only slightly more than that for commercial insurers.

Medicare and Medicaid fee reductions appear quite large by comparison. For office visits, they averaged 35 and 40 percent, respectively, and for hospital visits, the reductions were similar, 37 and 48 percent. In analyzing Medicare fee reductions for 1975, Ferry et al. (1980) found that total charges submitted by all physicians were reduced 18.4 percent, a rate far less than that reported using our limited set of procedures. It is therefore likely that the Medicaid fee reduction is overstated as well—possibly more so than with Medicare. It is also possible that physician self-reports consider the patient coinsurance under Medicare as part of the insurer's discount. When compared with what other insurers are paying, however, the reductions are not as large. Using commercials as a reference, Medicare and Medicaid pay only 7 and 13

Table 1

Reported usual fees and insurer allowables for office visits, hospital followups, and 2 specialized procedures, by physician speciality and type of procedure: 1976-77

Item	Specialty					
	All primary Care	GP ¹	General surgeon	Internist	OB-GYN ²	Pediatrician
Office visit						
Usual	\$14.80	\$12.74	\$15.51	\$17.07	\$18.28	\$13.24
Commercial	10.37	9.50	11.61	11.27	11.68	9.06
Blue Shield	12.97	11.52	13.11	14.89	15.34	12.45
Medicare	9.70	8.36	10.29	12.07	9.86	—
Medicaid	9.00	8.34	8.78	9.72	10.33	8.98
Hospital visit						
Usual	17.79	16.14	19.08	19.88	18.35	17.23
Commercial	14.29	13.17	15.57	14.86	15.70	14.43
Blue Shield	13.82	13.07	15.37	13.90	14.76	14.10
Medicare	11.16	10.22	12.35	12.66	10.72	—
Medicaid	9.25	9.04	9.20	9.47	8.94	9.63
Procedure 1						
			Gall bladder	ECG ³	D and C ⁴	Spinal puncture
Usual	—	—	686	25	215	22
Commercial	—	—	597	18	176	17
Blue Shield	—	—	588	18	168	17
Medicare	—	—	466	17	103	—
Medicaid	—	—	323	15	89	11
Procedure 2						
			Hernia repair	Proctoscope exam	Delivery	
Usual	—	—	427	29	547	—
Commercial	—	—	371	20	444	—
Blue Shield	—	—	349	21	417	—
Medicare	—	—	299	19	—	—
Medicaid	—	—	209	16	249	—

¹General practitioner.

²Obstetrics and gynecology.

³Electrocardiogram.

⁴Dilation and curettage.

NOTE: All fees are geographically deflated by area cost of living and are in 1977 dollars.

SOURCE: Health Care Financing Administration and National Opinion Research Center, 1976-77 surveys.

percent less, respectively, for office visits than commercial insurers do; for hospital visits the disparities are 22 and 35 percent.

The public programs apparently are relatively less generous for inpatient services, and this also shows up in the surgical procedures. Medicare pays only about 70 percent of the surgeon's usual fee for a cholecystectomy (gall bladder operation) or hernia repair; Medicaid pays only 50 percent. Both programs pay the obstetrician-gynecologist less than one-half his usual fee for dilation and curettage (D and C) or delivery. Commercial insurers and Blue Shield also significantly discount surgical fees, paying only about 80-87 percent of the usual fee.

Fee reductions by specialty

The incidence of the Medicare and Medicaid fee reductions is more or less evenly distributed across primary care specialties, with internists doing slightly better on their office visits from Medicare and pediatricians and general practitioners doing somewhat better from Medicaid. Medicare fee reductions on office visits average 30-35 percent except for OB-GYN's whose fee reduction is more than 40 percent (50 percent on D and C's). The fact that surgical fees are discounted more heavily would also imply greater losses incurred by surgeons and obstetricians, generally, when relative procedure mix is taken into account.

Summarizing, we do find corroborative evidence (admittedly based on physician self-reports) that both Medicare and Medicaid pay significantly less (e.g., 30-50 percent) than the physician's usual fee for office and inpatient visits as well as for surgical and diagnostic procedures. Commercial insurers and Blue Shield pay considerably better, but even their fee reductions ran 20-30 percent in 1976-77, and they are likely to be higher today. Clearly, the public programs are not alone in denying physicians at least part of their usual charges.

Changing meaning of the physician's "usual" fees

In spite of these findings, the Bureau of Labor Statistics, the American Medical Association and practically all other physician survey groups continue to use the physician's reported usual fee as the measure of price inflation. These list charges, however, obviously do not correspond well with actual payments, causing reflection on exactly what is meant by the term *usual fee*.

Practically all economic enterprises have established price lists in effect for specified time periods. These appear as stickers on new car windows and on grocery shelves, for example. However, because of discounts, rebates, bad debts, and in-kind exchanges, the price paid by the consumer is a varying fraction of the listed price. Discounts, rebates, and exchanges are all part of a marketing strategy to be used judiciously to maximize sales performance. Where most transactions are affected by these phenomena, the concept of a

usual charge loses much of its meaning, as exemplified by the rebate program of the U.S. domestic auto industry.

Because discounts, rebates, exchanges, and bad debts all tend to be a small percentage of revenues in most industries, the Bureau of Labor Statistics and others tend to ignore them in figuring inflation and average price levels. Among U.S. industries, the health care sector is practically unique (automobile repair shops are another example) in that patients pay only a small portion of the list price themselves, leaving most of the obligation to third-party insurance companies or to the Government. Without insurance, discounts and the like would still exist, but generally as a manifestation of physician price discrimination, or of the physician charging what the market will bear. With insurance, physicians are no longer guaranteed their usual fee if third-party payers choose to discount the bill, and this is in addition to any bad debts incurred from patients directly.

Different insurance methods can significantly alter the disparity between list prices and actual payments. Indemnity, or basic benefit, insurance pays the patient according to a ceiling or fee schedule. The patient in turn pays the physician and is liable for any difference between the ceiling and the physician's charge. Usual, customary, or reasonable (UCR) insurance coverage does not pay a fixed amount but is tied to the physician's actual charge, both during the current period and over time. Medicare uses its own version of UCR called CPR (customary, prevailing, and reasonable). It is similar to Blue Shield's UCR method in its incentive structure, although payment rates usually differ. Where actual charges do not exceed UCR screens, the insurer will pay the bill, adjusted for any deductible or coinsurance. Charges in excess of the screens must either be paid for out of pocket by the patient or the physician must forego the difference. A theoretical analysis of the relationship between charges and type of insurance is presented by Sloan and Steinwald (1975).

What is particularly intriguing about UCR methods is that next period's screens are partially a function of current period charges. This is because payers using UCR methods to define payment screens keep historical profiles of charges by physicians. These profiles produce a mean fee that becomes one of the screens in reviewing current bills. Higher fees charged in the past usually raise the limit allowed on current charges, up to an areawide limit. Thus, in billing UCR-covered patients (primarily Blue Shield, Medicare, and occasionally Medicaid), physicians have every incentive to submit inflated usual fees to increase reimbursement not only today but for all future periods (Lee and Hadley, 1981). The fees are usual only in the sense that the physician usually charges a fixed amount when submitting claims to, say, Medicare. They may not be the fees that are usually charged other patients or insurers. More importantly, they may not reflect the actual amounts usually paid by patients and third parties. In a world of UCR-like insurance, usual fees lose nearly all meaning, being determined as a

byproduct of a revenue maximization-expenditure control game played between physicians and third parties. This is distinct from simple price discrimination (Kessel, 1958), where physicians move down along their demand curves charging patients what they are willing to pay. The quoted usual charge to insurers may bear little relation to what any patient is actually paying. It may be an average usual fee, above average, or beyond the range any patient would be willing to pay.

Further complicating the concept of a usual fee are Blue Shield participation agreements and Medicare case-by-case assignment options. When a physician opts to participate in a Blue Shield insurance plan, he usually signs an agreement that commits him to accept the Blue Shield allowable as payment in full, forfeiting the option of collecting anything extra from the patient. In turn, the physician can bill Blue Shield directly for payment, thus avoiding collection difficulties with patients.

Medicare has a similar arrangement called assignment, except physicians always have a case-by-case option that they can selectively apply, depending on preferences in dealing directly with Medicare or with patients as well as the dollar size of the claim. For wealthy patients, physicians can refuse assignment and charge higher fees, for example. As of October 1984, physicians could sign a Medicare participation agreement in which they agreed to take all patients on assignment in return for fee updating in the future, among other advantages.

In contrast, Medicaid has no participation or assignment option. Only physicians can bill and collect from the program and, when they do, they must accept the Medicaid allowable as payment in full. They can bill the patient, of course, but because the patient cannot then collect any insurance, bad debts would be very high. If the Medicaid-eligible patient is also eligible for Medicare (usually the aged or disabled poor), then the physician bills Medicare under assignment and receives the higher Medicare allowable, with Medicaid paying any deductible or coinsurance. These are called joint eligibles or crossovers.

Although some Medicaid programs maintain Medicare CPR methods, most have switched to either a modified CPR system or a flat fee schedule (Holahan, 1984). In addition, many are slow in updating allowables and/or do not recognize specialty differentials, resulting in further discounting.

Comparisons of usual and average fees

Calculating an average fee

How does what a physician receives on the average for, say, an office visit compare with his stated usual fee? If insurers did not engage in fee discounting and all patients paid their bills in full, then usual and average prices would coincide, as assumed in most economic analyses of industry prices. No physician is so fortunate, however; all experience insurer reductions and bad debts.

A rough proxy for the physician's average fee can be determined as the weighted average of usual fees and insurer allowables after adjustment for bad debts, with the weights corresponding to insurance coverage percentages. Care must be taken, however, in adjusting for duplicate insurance coverage. Table 2 provides physician-reported insurance coverage by insurer, specialty, and extent of Medicaid participation, measured by the percent of a physician's patients with Medicaid coverage. In the absence of duplicate coverage, columns (1) through (5) should add to 100.0 percent, although it is unrealistic to expect such consistency from self-reported physician estimates.

Duplicate, or complementary, coverage comes primarily in Medicare,¹ so the following two additional data items were collected from physicians with Medicare patients:

- Percent of Medicare patients with private supplemental insurance (MSUP).
- Percent with joint Medicare and Medicaid coverage (MCAID).

Together the two figures represent the percent of Medicare patients who have additional coverage for Medicare deductibles, coinsurance, uncovered services, and higher unassigned charges. The last column of Table 2 gives the average percent of a physician's practice with *any* unduplicated insurance coverage ($= \text{COMM} + \text{BS} + \text{MCD} + (\text{MCARE}) (1 - \text{MSUP} - \text{MCAID})$). When added to column (1), the percent without any insurance, it should now total 100 percent; for specialty aggregates, the sum is close to 100 percent, although some duplication remains.

Without the Medicare dual coverage adjustment, duplicate coverage of patients results in significant overcounting, except for pediatricians whose Medicare coverage is minimal. Of the five primary care specialties, internists have the most overlapping Medicare supplemental coverage, nearly 30 percent ($= .434 (.435 + .208)$), because of their very heavy Medicare caseloads (43 percent on the average). By 1976, roughly 60 percent of all Medicare patients had either private supplemental insurance (Blue Shield or commercial) or were jointly eligible for Medicaid, a percent that is undoubtedly higher now. This supplemental coverage varied from 64.3 percent of internists' Medicare patients to 49 percent of OB-GYN's. (Pediatricians are excluded because of their low Medicare caseloads.) Thus, although many physicians claim they generally forego the Medicare deductible and coinsurance (Mitchell, Cromwell, and Shurman, 1981)² other third parties in fact do pick up the patient's liability in the majority of cases. Adding patient out-of-pocket payments to third-party supplemental coverage would imply that physicians receive a

¹This is not to be confused with families who enjoy multiple insurance coverage from different employers. Physicians are presumably reporting the actual source(s) of payment and not whether two or more insurers were potentially liable for the same bill.

²In the 1976 NORC survey, about 40 percent of the physicians reported that they never tried to collect the deductible and coinsurance for assigned bills from their patients, but certainly they would bill private insurers and Medicaid, if necessary.

very high percent of their usual fee on unassigned bills or of the Medicare allowable if assigned.

The remaining overlap, even after adjusting for dual Medicare coverage, grows larger with the extent of Medicaid participation. This is to be expected given the small sample sizes of these groups and the error in the self-reported data. Moreover, as one source of coverage becomes dominant, the chances of overestimating total coverage becomes more likely. Any remaining overlap (as evidenced in the last column)

can be adjusted by simply deflating average fees by columns (1) + (8).

Before turning to a description of how an average fee was constructed, it is interesting to note that the percent of patients without coverage does not seem to be correlated with Medicaid coverage, implying that insurance coverage on the average is about the same for all physicians. Higher Medicaid coverage substitutes for other insured patients, leaving each physician with roughly the same percent of uninsured patients.

Table 2

Percent of physician-reported insurance coverage by source of coverage, physician specialty, and extent of physician Medicaid participation: 1976-77

Specialty and Medicaid participation rate	No hospital insurance (1)	Source of coverage				Percent of Medicare patients with—		Percent with insurance (8)
		Commercial (2)	Blue Shield (3)	Medicaid (4)	Medicare (5)	Private supplemental insurance (6)	Joint Medicare and Medicaid (7)	
		Percent						
General practitioner	12.9	31.5	34.0	13.1	30.6	41.9	17.6	91.0
Less than 1 percent	10.2	36.1	38.9	—	36.2	54.9	—	91.3
1-5 percent	10.8	33.6	33.4	3.2	26.2	34.3	6.6	85.7
6-10 percent	15.0	32.5	34.1	9.6	24.9	41.1	14.3	87.3
11-20 percent	15.4	29.7	26.9	17.1	35.1	42.2	27.0	84.5
21-30 percent	13.7	25.7	28.0	27.3	33.4	40.7	26.4	92.0
31-50 percent	16.9	23.0	20.6	43.3	32.7	25.1	39.0	98.6
51 percent and more	13.3	19.6	55.9	63.2	19.3	39.6	24.5	145.6
General surgeon	7.2	30.8	38.6	13.4	32.3	43.9	17.3	95.3
Less than 1 percent	9.2	37.0	38.9	—	29.8	33.9	0.1	95.6
1-5 percent	4.9	33.6	44.3	3.3	32.7	56.1	6.8	93.3
6-10 percent	5.6	30.7	41.2	9.8	32.3	40.1	9.2	98.1
11-20 percent	10.4	27.8	33.8	17.1	31.2	41.7	25.9	88.8
21-30 percent	8.6	27.0	31.2	27.1	33.6	37.3	27.8	97.0
31-50 percent	8.1	28.3	33.7	40.5	36.5	35.1	30.7	115.0
51 percent and more	7.7	13.0	12.0	68.3	12.1	3.4	59.2	97.8
Internist	6.3	27.6	29.7	13.2	43.4	43.5	20.8	86.0
Less than 1 percent	7.1	30.3	42.4	—	46.0	39.1	11.4	95.5
1-5 percent	5.7	26.2	41.8	3.2	43.6	42.0	20.0	87.8
6-10 percent	4.7	28.7	46.9	9.7	49.5	48.9	20.5	100.4
11-20 percent	6.3	29.0	43.6	17.3	44.2	45.6	19.8	105.2
21-30 percent	9.9	31.1	24.9	27.7	30.7	50.1	18.1	93.5
31-50 percent	3.0	20.1	27.8	41.4	29.2	37.0	26.1	100.1
51 percent and more	13.4	13.2	21.0	73.0	41.5	7.8	63.9	118.9
Obstetrics and gynecology	11.2	35.6	45.7	8.4	9.3	37.9	11.1	94.4
Less than 1 percent	10.5	36.9	50.1	—	11.8	38.7	.4	94.2
1-5 percent	10.4	27.7	46.8	3.2	6.7	40.7	6.6	81.2
6-10 percent	11.2	28.9	45.4	9.5	6.7	35.2	6.4	87.7
11-20 percent	13.4	30.8	41.7	17.3	9.3	37.5	14.6	94.3
21-30 percent	16.8	28.9	37.4	27.5	7.3	41.3	23.7	96.4
31-50 percent	10.0	28.2	35.9	41.0	14.5	25.3	24.2	112.4
51 percent and more	12.3	13.3	20.9	69.6	8.6	—	61.4	107.1
Pediatrics	16.7	32.1	38.9	14.1	1.1	12.3	21.5	85.8
Less than 1 percent	18.6	34.2	45.9	—	0.2	—	—	80.3
1-5 percent	19.1	34.1	41.2	3.7	0.4	1.0	1.0	79.4
6-10 percent	14.7	34.0	41.2	9.6	2.1	13.8	3.8	86.5
11-20 percent	16.9	32.5	40.4	17.2	0.7	54.3	19.4	90.3
21-30 percent	15.8	30.9	32.2	36.9	3.0	—	20.0	102.4
31-50 percent	11.3	28.2	26.4	41.9	1.8	7.0	43.5	97.4
51 percent and more	11.9	9.9	11.6	74.4	1.2	1.0	42.3	96.6

SOURCE: Health Care Financing Administration and National Opinion Research Center, 1976-77 surveys.

Practices with small Medicaid caseloads run about 30-40 percent each for commercial, Blue Shield, and Medicare, and those with large Medicaid caseloads generally average 20-30 percent each, before adjusting for duplicate coverage. OB-GYN's and pediatricians are notable exceptions because of their consistently smaller Medicare caseloads. For these specialists, private coverage ranges from a high of 80-85 percent for Medicaid nonparticipants to a low of 20 percent for those heavily dependent on Medicaid.

Besides adjusting average payments for duplicate coverage, we also must adjust for Blue Shield participation and Medicare assignment, for each implies a different average payment. Nonparticipants in Blue Shield would presumably be charging their usual fee and not accepting the insurer's allowable as payment in full. The same should be true for physicians refusing Medicare assignment.

All adjustments can be summarized in the following equation for the average fee for the i th procedure, j th specialty, and k th Medicaid participation group:

$$AF_{ijk} = (1 - RFBD) \frac{TCH}{Q} = \quad (1)$$

$$(1 - RFBD) \sum_m w_m AF_m$$

$$= (1 - RFBD) \cdot \left[\begin{array}{l} UFEE \cdot [NOHI + \\ BS \cdot NPAR + NASG] \\ MCARE] \\ + BSFEE \cdot [BS \cdot PAR - \\ .5 \cdot MCARE \cdot MSUP] \\ + COMFEE \cdot [COMM - \\ .5 \cdot MCARE \cdot MSUP] \\ + MCARFEE \cdot [ASGN \cdot \\ MCARE] \\ + MCD FEE \cdot [MCD - \\ MCARE \cdot MCAID] \end{array} \right]$$

where (TCH/Q) = total charges per unit of service; w_m = share of charges from m th payer; AF_m = average fee (allowable) of m th payer; PAR, NPAR = percent of Medicare physicians participating and not participating in Blue Shield; ASGN, NASGN = percent of Medicare patients' charges assigned versus nonassigned; and RFBD = percent of uncollected bills from patients. Average fees were discounted further for any remaining insurance duplication after Medicare supplementary coverage and crossovers were accounted for.

Usual fees are assumed to be billed when the following are true:

- Patients have no insurance.
- The patient is covered by Blue Shield but the physician does not participate.
- The patient is covered by Medicare but the physician does not accept assignment.

Hence, when the physician refuses assignment and bills his usual charge, the patient is liable for any Medicare deductible, copay, and any fees in excess of

the Medicare allowable. Blue Shield allowable fees are billed (or received) when the patient is covered by Blue Shield and the physician does participate. Because Blue Shield percentages include some Medicare patients, a deduction is made for Medicare patients who also have supplementary coverage, half of which have arbitrarily been taken from reported Blue Shield percentages and the other half from commercials. Commercial fees are weighted by the percent with commercial insurance with the identical Medicare overlap adjustment. Medicare allowable fees are received only for assigned patients, and Medicaid fees are received only for the "pure" Medicaid portion of the physician's practice, namely those without joint Medicare coverage and who presumably have already been counted as assigned Medicare patients. This insurance-weighted fee is then reduced by the reported bad debt ratio, resulting from patient nonpayment of usual fees, deductibles, or copayments. Ideally, bad debts would be insurer-specific, but they were not reported in such a fashion. Most bad debts, of course, come from the uninsured, but some insured patients do not pay all of their deductible or copay, further reducing physician average payments. Presuming bad debt rates are higher when the usual fee is charged, the inability to apply different rates across payers overstates the size of Medicare and Medicaid discounts by some unknown amount.

Blue Shield nonparticipation rates by specialty and bad debt ratios are taken from the 1976 HCFA and NORC survey. Assignment rates come from Ferry et al. (1980). Of the assignment rates, 50 percent were assumed for the relatively small percent of OB-GYN and pediatric patients with Medicare coverage. Considerable variation in assignment rates exists by State (e.g., from 20 percent to 80 percent), far more than by specialty. Because interest was in national estimates of discounting by specialty, however, incorporating interspecialty differences took priority. Unfortunately, Ferry et al. (1980) did not have a breakout of assignment rates by specialty by State that would have allowed a finer distinction. To the extent that assignment rates and Medicare discounts are inversely correlated, using a specialty-wide assignment rate probably understates the physician's average fee.

As an example of the way in which average fees were calculated, consider GP hospital visits:

$$AF = (1 - .12) \left[\begin{array}{l} \$16.14 \cdot [.13 + (.34) (.15) + (.51) (.31) = .33] \\ + \$13.07 \cdot [(34) (.85) - (.5) (.31) (.42) = .23] \\ + \$13.17 \cdot [.32 - (.5) (.31) (.42) = .25] \\ + \$10.22 \cdot [(49) (.31) = .15] \\ + \$9.04 \cdot [.13 - (.31) (.17) = .08] \end{array} \right]$$

= (.88)(\\$13.35) = \\$11.74, with a small (4 percent) adjustment for residual duplicate coverage. According to our figures, only 33 percent of patients are truly "billed" the physician's usual fee;³ 23 percent, the

³Other patients may be billed the physician's usual fee, but the insurer only pays a reduced amount. The difference between the physician's usual fee and the insurer's allowable is what the patient owes, which is then deflated by bad debts.

Blue Shield fee; 25 percent, the commercial fee; 15 percent, the Medicare allowable; and 8 percent, the Medicaid fee, resulting in an average billed fee of \$13.35 before bad debts. Adjusting for a 12-percent uncollectible rate on out-of-pocket bills produces a final estimated average fee of \$11.74, which is 73 percent of the GP's usual inpatient fee of \$16.14.

Usual versus average fees

Shown in Table 3 are average office, hospital, and procedure fees by specialty and extent of Medicaid participation, calculated in the manner just described. Usual fees for the specialty, taken from Table 1, are also provided for comparison. Column (2) gives average fees for all physicians in a particular specialty, and the last two rows in the table give usual and average fees for all primary care physicians taken together. Numbers of physicians upon which the fees in columns (1) and (2) are calculated are given in parentheses alongside the type of visit or procedure.

After accounting for patient bad debts and insurer fee reductions, physicians receive only about 70-77 percent of their usual office or hospital fee on the average. Average fees of general practitioners (77 percent for both office and hospital visits) come the closest to their usual fees, and those for surgeons and OB-GYN's (69-74 percent) are the lowest. These

differences amount to about \$3-\$5 per visit in absolute terms. If discount rates have risen since 1976-77, these figures understate current discrepancies between usual charges and actual receipts.

The ratio of average to usual fees is also about the same for special procedures: cholecystectomy (gall bladder operation), 74 percent; electrocardiogram, 72 percent; delivery, 70 percent; and a spinal puncture, 71 percent. According to self-reports, surgeons usually charged \$686 (cost of living adjusted in 1977 dollars) for a gall bladder operation, but received only \$508 on the average; internists charged \$25 for an electrocardiogram, but received only \$18; and OB-GYN's charged \$547 for a delivery, but received only \$381 on the average.

Average fees for office and hospital visits usually, but not always, decrease as Medicaid participation increases. GP's with more than 50 percent of their practice devoted to Medicaid patients average \$9.51 for an office visit or \$1 less than physicians with just 1-5 percent Medicaid patients. The absolute difference in hospital visit fees is twice as much, or more than \$2. Yet, these differences generally disappear when extra large Medicaid practices (ELMP's)—those that have 51 percent or more Medicaid patients—are compared with practices that have 6-10 percent Medicaid patients.

Table 3
Usual and average office, hospital, and procedure fees, by physician specialty, procedure, and extent of Medicaid participation

Item (N)	Usual fee (1)	Overall average fee (2)	Medicaid participation rate							Usual fee
			Less than 1 percent (3)	1-5 percent (4)	6-10 percent (5)	11-20 percent (6)	21-30 percent (7)	31-50 percent (8)	51 percent and more (9)	51 percent and more (10)
Average fee										
General practitioner										
Office (896)	\$12.74	\$9.35	\$9.39	\$10.54	\$9.74	\$9.86	\$9.42	\$10.26	\$9.51	\$12.63
Hospital (966)	16.14	12.53	13.24	13.32	11.75	12.66	11.68	11.29	11.10	14.18
General surgeon										
Office (678)	15.51	11.26	10.55	11.44	10.41	10.75	12.69	11.92	10.17	18.12
Hospital (583)	19.08	13.83	12.53	14.80	13.18	12.79	14.36	14.71	11.45	24.16
Cholecystectomy	686.00	508.00	466.00	525.00	508.00	489.00	531.00	512.00	396.00	706.00
Hernia repair	427.00	318.00	286.00	323.00	316.00	305.00	338.00	349.00	205.00	395.00
Internist										
Office (765)	17.07	12.98	12.30	13.84	12.91	13.10	11.43	12.03	12.26	18.62
Hospital (750)	19.88	14.38	12.87	15.76	13.95	15.33	12.45	12.36	13.45	20.35
Electrocardiogram	25.00	18.02	15.46	18.64	17.22	18.13	20.09	19.03	17.67	26.00
Proctoscope exam	29.00	20.75	16.60	20.11	21.56	22.10	22.90	20.55	21.98	27.00
Obstetrics and gynecology										
Office (795)	18.28	12.70	13.85	12.80	12.28	10.98	11.44	11.79	12.51	19.38
Hospital (491)	18.35	13.66	16.24	14.21	13.01	11.29	10.92	11.88	14.76	19.78
Dilation and curettage	215.00	154.00	168.00	155.00	150.00	129.00	160.00	137.00	99.10	173.00
Delivery	547.00	381.00	398.00	402.00	370.00	320.00	404.00	328.00	265.00	456.00
Pediatrics										
Office (804)	13.24	10.01	11.04	10.66	9.61	8.43	10.29	10.32	8.52	12.63
Hospital (768)	17.23	12.93	15.04	13.38	12.67	11.58	12.54	12.75	9.65	14.28
Spinal puncture	22.00	15.58	15.51	15.19	15.21	17.53	18.47	12.65	8.94	14.00
All primary care										
Office (3,938)	15.28	11.31	11.27	11.69	10.84	10.47	10.84	11.09	10.45	15.93
Hospital (3,558)	17.94	13.67	13.86	14.21	12.82	12.81	12.35	12.47	11.84	17.88

NOTE: Figures in parentheses = number of physicians reporting.

How can ELMP physicians enjoy average payments comparable to those received by colleagues far less dependent on the public programs? According to Table 3, ELMP's actually report usual, commercial, and Blue Shield fees above those in the 6-10 percent group, thereby almost completely offsetting the heavier dependence on low Medicaid fees. Higher private fees could be explained by demand factors or by restricted supply of ELMP physicians. Another factor is the joint Medicare and Medicaid coverage of many Medicaid patients for whom the physician receives the usually higher Medicare fee. Consider surgeons that have 6-10 percent Medicaid patients versus those in ELMP's. Both show nearly the same average office fee (\$10.41 versus \$10.17), in spite of a sevenfold difference in Medicaid-covered patients (9.8 percent versus 68 percent). For Medicaid patients with joint Medicare eligibility, the ELMP surgeon receives a Medicare fee that is \$4 higher on the average, reducing the discount of seeing Medicaid eligibles.

The Medicaid fee-reduction effects associated with greater participation are much more dramatic on surgical procedures, as evidenced in Table 3. Average cholecystectomy fees decrease from \$508 for the physician that has 6-10 percent Medicaid patients to only \$396 for the surgeon in the ELMP; hernia repair, from \$316 to \$205; D and C's, from \$150 to \$99; and deliveries, from \$370 to \$265. Ancillary diagnostic average fees, on the other hand, seem little affected by Medicaid participation in spite of Medicaid fees being only 50-67 percent of usual charges. This is apparently because there is less discounting in ELMP's by other insurers, which may be just a statistical artifact of small sample sizes.

Another way of measuring Medicaid participation effects is by comparing usual and average fees for heavy Medicaid participants. We expect the difference to be considerably greater than the 30-37 percent reduction averaged across all physicians because of the heavier reliance on low-paying Medicaid programs. Such a comparison is made in the last two columns of Table 3. Average fees do appear correspondingly less than usual fees for heavy Medicaid participants, with the notable exception of GP's. ELMP surgeons actually receive average visit and surgical fees that are only about one-half their usual fee, and ELMP internists, OB-GYN's, and pediatricians receive average visit fees that are about two-thirds their usual fees. OB-GYN's receive fees for D and C's and deliveries that are only 57 percent of usual fees in ELMP's. Medicaid-dependent GP's appear to be relatively immune to the Medicaid fee reductions, beyond those already imposed on all GP's, because the Medicaid payment is relatively higher in comparison with their usual charge than for specialists', and they are less dependent on Medicare and its associated fee reductions. By contrast, surgeons, internists, and OB-GYN's heavily dependent on Medicaid face significantly lower relative average fees apparently because of heavy commercial and Blue Shield discounting as well. Blue Shield, for example, is reported to pay only one-half the ELMP surgeon's

usual hospital fee (Cromwell and Burstein, 1982). ELMP internists are penalized further by serving the elderly poor and having to accept assignment, although their Medicare allowables are similar to what Blue Shield pays.

Medicare and Medicaid fee reductions and physicians' incomes

If average fees, which include adjustments for third-party fee reductions and patient bad debts, run 70-77 percent of physicians' usuals, then without any reductions physicians' incomes would be 23-30 percent higher than they already are, *ceteris paribus*. With just bad debts and no insurer reductions, incomes would be roughly 10-20 percent higher, given average bad debt ratios. Heavy Medicaid participants should be especially affected by insurer fee discounting, as average fees run only 50 percent of usuals in many cases.

In this section reported net incomes are compared by specialty and extent of Medicaid participation to see if lower average fees do result in proportionally lower incomes. Net incomes are then decomposed into markups, productivity, and physician work effort to explain why incomes of heavy public program participants are not even lower than they are. Finally, a simulation of incomes and average fees under alternative Medicare and Medicaid fee scenarios is conducted.

Physician net incomes and Medicaid participation

Physicians' net incomes and their imputed hourly earnings are shown in Table 4 by specialty and extent of Medicaid participation. As with fees, all figures are regionally adjusted for cost of living and are given in 1977 dollars.

Physicians who see no Medicaid patients along with those heavily dependent on the program generally report the lowest incomes. Incomes are usually highest among the majority of practitioners who see few Medicaid patients, with incomes falling as Medicaid participation rises. GP's with more than half their practice devoted to Medicaid patients, for example, show average incomes \$8,000-\$13,000 less than those who are less dependent on the program. For internists, it is \$7,000-\$9,000 less; OB-GYN's, \$1,000-\$5,000 less; pediatricians \$0-\$3,000 less. General surgeons do not show the same consistent trend. For ELMP surgeons, the income differential is more than \$25,000 compared with limited Medicaid participants, but the 30-50 percent group actually report higher-than-average incomes. Small sample sizes (only 43 surgeons fell into this group) probably explain this anomaly.

Yet, except for the one surgical group, the income decline associated with greater Medicaid dependence is not that great in percentage terms. Medicaid-dependent internists, OB-GYN's, and pediatricians do not appear any more affected, relative to their peers, by

heavy Medicaid fee reductions, and ELMP GP's have incomes only 17 percent lower when compared with minimal (1-5 percent) participants. This is consistent with earlier findings on average payments (Table 3), which showed surprisingly little variation by extent of Medicaid participation, at least for office and hospital visits. By contrast, average surgical fees are remarkably lower in ELMP's, which may explain the dramatic decline in the incomes of ELMP surgeons. Why net incomes of OB-GYN's, who are heavily dependent on Medicaid and who experience extensive Medicaid discounting of D and C's and deliveries, are not significantly lower is paradoxical. Decomposing incomes may provide a partial resolution to the question of how Medicaid-dependent physicians earn as much as they do.

Decomposition of net incomes

Variations in net incomes can be caused by differences in markups, or gross incomes minus costs divided by total visits; productivity, or visits per physician hour; and work effort, or physician hours per year devoted to medical practice. Algebraically, we have

$$Y = \left[\frac{GR}{V} - \frac{TC}{V} \right] \cdot \frac{V}{HRS} \cdot HRS, \quad (2)$$

where Y = net income, GR/V = gross revenues per visit (or average revenues), TC/V = total costs per visit (or average costs), V/HRS = visits per physician hour, and HRS = total physician hours per year. The bracketed term represents markups of average charges over average costs, and the other two multiplicands

proxy productivity and work effort, respectively.

Lower public fees should have a direct impact on physicians' average revenues as well as indirect impacts on average costs, productivity, and input. To offset lower fees, heavy Medicaid and Medicare participants could lower average costs; raise visits per hour by becoming more efficient or skimping on care; or simply work harder, longer hours. Each response has different policy implications, ranging from poorer quality care for public beneficiaries to greater physician access through increased effort.

Table 5 provides a breakdown of calculated net incomes by specialty and extent of Medicaid participation. Average revenues and cost per visit are given in columns (1) and (2), respectively, along with markups in column (3). Visits per hour is determined by dividing total annual visits, column (6), by estimated annual hours (equal to reported average hours per week times average weeks worked per year). Calculated net income, in column (7), is the product of markups per visit times visits. As before, all dollar figures have been adjusted for geographic differences in cost of living and are expressed in 1977 dollars.

A rough, inverse correlation exists between extent of Medicaid participation and markups, attributable entirely to declining average revenues. General practitioners with over half their practice devoted to Medicaid patients have markups roughly \$1-\$1.50 lower than their colleagues with only 1-10 percent Medicaid. Heavy Medicaid participants offset these losses, albeit not entirely, through greater productivity per hour—3.79 visits per hour versus 3-3.25 per hour in small Medicaid practices. Yet, GP's heavily dependent on Medicaid do not work more hours than other physi-

Table 4
Physician net incomes and imputed hourly wages in 1977 dollars by physician specialty and extent of Medicaid participation

Medicaid participation rate	Specialty					Average
	General practitioner	General surgeon	Internist	Obstetrics and gynecology	Pediatrics	
	Income and hourly wages					
Less than 1 percent	\$54,420 (23.58)	\$59,410 (26.06)	\$53,115 (25.00)	\$69,100 (29.06)	\$58,373 (25.46)	\$59,271 (25.92)
1-5 percent	59,471 (24.08)	73,770 (30.01)	68,022 (26.08)	74,236 (30.10)	54,419 (24.64)	65,096 (27.11)
6-10 percent	57,646 (21.15)	71,313 (29.37)	61,892 (26.39)	78,296 (29.32)	57,719 (24.28)	65,907 (26.18)
11-20 percent	62,770 (24.82)	72,583 (29.03)	63,960 (25.39)	65,278 (27.52)	54,525 (23.57)	64,040 (26.16)
21-30 percent	58,331 (24.07)	72,908 (32.08)	62,983 (24.69)	71,761 (25.87)	47,765 (24.37)	63,271 (26.25)
31-50 percent	52,837 (22.77)	82,076 (33.40)	58,337 (26.15)	74,002 (30.99)	49,595 (20.67)	63,959 (27.02)
51 percent and more	49,850 (22.34)	45,466 (18.83)	54,219 (25.81)	72,985 (26.20)	54,871 (28.17)	55,985 (24.20)
Average	57,742 (23.50)	71,503 (29.57)	59,616 (25.68)	71,798 (29.05)	54,712 (24.34)	—

NOTE: Imputed hourly wages, shown in parentheses, are defined as reported annual net incomes divided by an estimate of annual hours in medical practice. All data have been adjusted for regional cost of living.

cians; in fact, annual hours are slightly less, 2,231 versus 2,470 to 2,726 hours. A similar pattern exists for the other primary care specialties, with lower average revenues and markups being partially offset by greater productivity per hour. Annual work effort, however, appears unrelated to participation rates.

General practitioners and pediatricians exhibit the lowest markups—\$6-\$8.25 per visit compared with \$8-\$15 markups in the other specialties. They offset this to some extent by seeing more patients per hour although their incomes still remain less. Pediatrician incomes are the lowest of the five, because of a combination of low average revenues and fewer hours seeing patients.

Earlier, we remarked on the relatively high incomes of ELMP obstetricians. Once their incomes are decomposed, we do find a decline in average revenues and markups as expected, offset by greater productivity per hour. This is consistent with the findings for other specialties as well.

Simulating physician incomes by raising Medicare and Medicaid fees

Suppose Medicare and Medicaid raised their allowables to those of commercial insurers. What impact would that have on physicians' earnings? Better

Table 5
Decomposition of net incomes into markups, productivity, and work effort, by physician specialty and extent of Medicaid participation

Specialty and Medicaid participation rate	Average revenue (1)	Cost per visit (2)	Markups ¹ (3)	Visits per hour ² (4)	Annual hours (5)	Annual visits (6)	Calculated net income (7 = 3x6)
General practitioner							
Less than 1 percent (145)	\$12.12	\$5.38	\$6.74	3.28	2,307	7,578	\$51,076
1-5 percent (166)	13.48	5.61	7.88	3.26	2,470	8,044	63,383
6-10 percent (105)	12.68	5.53	7.15	2.99	2,726	8,157	58,323
11-20 percent (116)	12.06	4.91	7.15	3.24	2,529	8,191	58,567
21-30 percent (73)	11.67	4.91	6.77	3.59	2,423	8,704	58,925
31-50 percent (45)	12.04	5.17	6.86	3.48	2,321	8,073	55,379
51 percent or more (26)	12.33	6.02	6.31	3.79	2,231	8,451	53,328
General surgeon							
Less than 1 percent (75)	23.31	10.10	13.21	2.13	2,280	4,848	64,047
1-5 percent (180)	20.33	6.15	14.18	2.42	2,458	5,945	84,301
6-10 percent (133)	20.72	7.05	13.67	2.36	2,428	5,728	78,295
11-20 percent (118)	19.93	7.19	12.74	2.48	2,500	6,191	78,878
21-30 percent (70)	19.96	7.35	12.61	2.53	2,273	5,756	72,580
31-50 percent (43)	18.32	6.33	11.99	2.96	2,457	7,284	87,332
51 percent or more (6)	13.05	5.12	7.93	3.09	2,415	7,460	59,161
Internist							
Less than 1 percent (131)	19.08	7.38	11.70	2.33	2,125	4,957	58,000
1-5 percent (177)	20.60	6.94	13.65	2.17	2,340	5,069	69,191
6-10 percent (96)	15.80	6.05	9.75	2.64	2,345	6,200	60,454
11-20 percent (83)	17.90	6.35	11.54	2.47	2,519	6,218	71,750
21-30 percent (45)	14.48	5.90	8.58	2.97	2,551	7,584	65,070
31-50 percent (37)	15.18	5.55	9.63	2.61	2,231	5,833	56,173
51 percent or more (15)	22.60	10.21	12.39	2.09	2,101	4,384	54,323
Obstetrics and gynecology							
Less than 1 percent (230)	20.35	7.59	12.76	2.57	2,378	6,116	78,043
1-5 percent (207)	20.85	7.85	12.98	2.57	2,466	6,349	82,411
6-10 percent (86)	21.12	7.22	13.90	2.47	2,670	6,603	91,779
11-20 percent (85)	23.47	8.56	14.91	2.04	2,372	4,832	72,046
21-30 percent (53)	18.90	7.23	11.67	2.49	2,774	6,900	80,528
31-50 percent (46)	19.32	8.73	10.59	2.90	2,388	6,917	73,254
51 percent or more (10)	18.59	7.58	11.01	2.86	2,786	7,976	87,811
Pediatrics							
Less than 1 percent (118)	13.84	5.60	8.24	3.17	2,293	7,271	59,917
1-5 percent (144)	13.88	4.84	8.05	3.13	2,209	6,911	55,630
6-10 percent (91)	11.48	4.37	7.11	3.45	2,377	8,189	58,221
11-20 percent (96)	10.41	4.18	6.24	3.64	2,313	8,427	52,587
21-30 percent (56)	13.16	5.46	7.71	3.12	1,960	6,109	47,100
31-50 percent (51)	11.00	5.06	5.94	3.27	2,399	7,841	46,575
51 percent or more (25)	12.99	5.49	7.50	3.68	1,948	7,163	53,721

¹Column (1) minus column (2).

²Column (6) divided by column (5).

NOTE: Figures in parentheses = number of physicians reporting.

SOURCE: Health Care Financing Administration and National Opinion Research Center, 1976-77 surveys.

yet, what if the two public programs actually paid the physician's usual fee? This section provides answers to these questions by simulating net incomes under these two conditions.

Simulation method

The impact of raising Medicaid and/or Medicare allowable fees on physicians' gross and net incomes can be simulated as follows. First, actual gross revenues (GR_a) can be written as

$$GR_a = MF \cdot MV + UF \cdot NMV, \quad (3)$$

where MF = Medicaid allowable fee, MV = total Medicaid visits, UF = the physician's usual fee, and NMV = non-Medicaid visits, assuming for the moment no fee reductions on non-Medicaid patients.

Replacing the Medicaid fee with the usual fee, and assuming no behavioral changes such as treating more Medicaid patients, simulated gross revenues (GR_s) would be

$$GR_s = UF \cdot MV + UF \cdot NMV, \quad (4)$$

and the net increase in gross revenues, ΔGR , would be equal to the Medicaid fee reduction, weighted by Medicaid visits;

$$\Delta GR = GR_s - GR_a = (UF - MF) \cdot MV. \quad (5)$$

This difference can then be rewritten in terms of actual gross revenues as

$$\Delta GR = GR_a \cdot \left[\frac{MV}{V} \cdot \frac{MF}{AF} \cdot \left(\frac{UF}{MF} - 1 \right) \right] \quad (6)$$

where $V = MV + NMV$ = total visits, and AF = average revenues (or fees) per visit, and $GR_a = V \cdot AF$.

Absolute increases in gross revenues will depend on the following:

- The percentage by which the usual fee exceeds the Medicaid allowable (UF/MF).
- How close the Medicaid fee is to average revenues per visit to begin with (MF/AF).
- The physician's Medicaid participation rate (MV/V).
- The initial gross revenues, or absolute size, of the practice.

Where Medicaid fees already equal usual fees, no financial gain is realized. The same is true for Medicaid nonparticipants, barring any entry because of more generous public fees. Where Medicaid fees are less than usual fees and participation is positive, revenue increases will depend on the four reasons above.

This simplified formula can be expanded to include Medicare effects through a similar weighting scheme:

$$\Delta GR = GR_a \cdot \left[\frac{MV}{V} \cdot \frac{MF}{AF} \cdot \left(\frac{UF}{MF} - 1 \right) + \frac{MCV}{V} \cdot \frac{MCF}{AF} \cdot \left(\frac{UF}{MCF} - 1 \right) \right] \quad (7)$$

where MCV and MCF refer to Medicare visits and fees, respectively. Medicaid versus Medicare effects of raising fees can be isolated by simply setting the other public participation rate equal to zero. The lengthy term in brackets represents a weighted sum adjustment of relative fees to gross revenues, the weights being the Medicaid and Medicare gross revenue shares. As before, simulated Medicaid and Medicare fee effects can be attributed to the size of the original discounts in the two programs plus the relative dependence on the two public programs. The necessary adjustments to implement the following simulation are provided in the technical note.

Simulation results

The simulation results, first, for raising Medicare and/or Medicaid allowables to physician usual fees, then using the more conservative commercial rates are shown in Tables 6 and 7. Columns (1) and (2) provide estimates of changes in gross revenues due to increased Medicaid and to Medicaid-plus-Medicare allowables. Columns (3) and (4) show the impacts these increases would have on net incomes, again assuming no behavioral changes, while the last two columns put the absolute changes in percentage terms using net incomes as the base.

Raising Medicaid allowables alone to physician usuals would add \$3,730 (in 1977 dollars) to the average GP's income, \$6,255 to the average surgeon's, \$2,647 to the internist's, \$6,861 to the OB-GYN's, and \$7,016 to the pediatrician's income. Internists' incomes would rise the least, only 4.4 percent versus 12.8 percent for pediatricians. Raising both public program fees simultaneously would have considerably greater effects—particularly for GP's, surgeons, and internists whose incomes would rise 18-22 percent.

Raising Medicaid and/or Medicare allowables to usual fees would radically alter the income ranking by the extent of Medicaid participation, other things being equal. For example, GP's with more than 30 percent of their patients on Medicaid would stand to gain \$14,000-22,000 making them the highest rather than the lowest earners among nonspecialists (Table 6, columns (3) and (4)). The same is true of the other four primary care groups. As expected ELMP general surgeons and OB-GYN's stand to gain the most from higher public fees. If Medicare and Medicaid both paid usuals, then Medicaid-dependent surgeons and OB-GYN's could gain over \$60,000 per year, a figure that would more than double the surgeon's income and raise the OB-GYN's 82.5 percent.

These are dramatic examples, however. For the majority of primary care practitioners, namely those with less than 10 percent Medicaid patients, income effects of raising Medicaid fees would be modest, i.e., less than 10 percent. Raising Medicaid and Medicare simultaneously, on the other hand, would imply much larger gains, e.g., up to 34 percent for internists.

Adjusting Medicare and Medicaid fees to be competitive with commercial insurers would have far less dramatic effects on physicians' incomes, as shown in Table 7. Raising Medicaid fees alone would add only \$1,000 to internists' average income, but up to \$4,089 to that of general surgeons. Raising both public allowances would still add only \$1,746 to \$8,382, respectively. Surgeon incomes would rise by as much as 11.7 percent; GP's, 7.1 percent; internists, 2.9 percent;

OB-GYN's, 8.2 percent; and pediatricians, 3.4 percent.

Of course, heavy Medicaid participants would gain more. Among GP's, surgeons, internists, and pediatricians, the effect of raising both Medicare and Medicaid fees to commercial levels would be to bring heavy Medicaid participants in line with their peers, thereby eliminating the penalty associated with seeing the poor and the elderly. Heavy OB-GYN participants would

Table 6
Impact of raising Medicare and Medicaid allowable fees to simulated usual charges by physician specialty and extent of Medicaid participation

Specialty and Medicaid participation rate	△Gross revenue		Net income		△Gross revenue as a percent of net income	
	Medicaid (1)	Medicaid plus Medicare (2)	Medicaid (3)	Medicaid plus Medicare (4)	Medicaid (5)	Medicaid plus Medicare (6)
General practitioner						
Total	\$3,730	\$10,227	\$61,472	\$67,969	6.5	17.7
Less than 1 percent	0	10,705	54,420	65,125	0	19.7
1-5 percent	934	7,717	60,404	67,187	1.8	13.0
6-10 percent	3,419	9,067	61,065	66,713	5.9	15.7
11-20 percent	3,784	10,178	66,553	72,947	6.0	16.2
21-30 percent	10,364	17,787	68,695	76,117	17.8	30.5
31-50 percent	14,509	20,435	67,346	73,272	27.5	38.7
51 percent or more	18,622	22,665	68,472	72,515	37.4	45.6
General surgeon						
Total	6,255	15,620	77,758	87,123	8.7	21.8
Less than 1 percent	0	13,023	59,410	72,434	0	21.9
1-5 percent	1,049	11,869	74,820	85,640	1.4	16.1
6-10 percent	5,455	14,872	76,768	86,185	7.6	20.9
11-20 percent	7,906	19,629	80,490	92,213	10.9	27.0
21-30 percent	12,868	20,224	85,776	93,132	17.7	27.7
31-50 percent	24,987	31,602	107,063	113,678	30.4	38.5
51 percent or more	59,834	63,865	105,229	109,330	131.6	140.5
Internist						
Total	2,647	11,864	62,263	71,480	4.4	19.9
Less than 1 percent	0	16,417	53,115	69,532	0	30.9
1-5 percent	0	10,474	61,022	71,495	0	17.2
6-10 percent	0	9,878	61,892	71,770	0	16.0
11-20 percent	6,866	15,269	70,826	79,229	10.7	23.9
21-30 percent	15,297	21,671	78,280	84,653	24.3	34.4
31-50 percent	21,467	27,193	79,805	85,530	36.8	46.6
51 percent or more	32,810	42,019	87,029	96,238	60.5	77.5
Obstetrics and gynecology						
Total	6,861	11,039	78,657	82,835	9.6	15.4
Less than 1 percent	0	5,961	69,100	75,061	0	8.6
1-5 percent	2,709	5,902	76,946	80,138	3.7	8.0
6-10 percent	8,075	10,894	87,361	90,180	10.2	13.7
11-20 percent	15,308	19,506	80,586	84,784	23.5	29.9
21-30 percent	21,252	24,384	93,013	96,145	29.6	34.0
31-50 percent	34,945	42,277	108,947	116,279	47.2	57.1
51 percent or more	56,260	60,180	129,244	133,165	77.1	82.5
Pediatrics						
Total	7,016	7,362	61,728	62,074	12.8	13.5
Less than 1 percent	0	0	58,373	58,373	0	0
1-5 percent	1,783	1,851	56,202	56,270	3.3	3.4
6-10 percent	4,494	5,877	62,213	63,596	7.8	10.2
11-20 percent	8,273	10,483	62,798	65,008	15.2	19.2
21-30 percent	8,828	9,398	56,593	57,163	18.5	19.7
31-50 percent	13,054	13,383	62,649	62,978	26.3	27.0
51 percent or more	33,950	34,239	88,821	89,110	61.9	62.4

NOTE: △ = increase in gross revenue.

still become the highest paid in their specialty, although again the differences would be far less than if usuals were the guide.

How much of the simulated income increases can be attributed to some physicians simply being more dependent on Medicare and Medicaid to begin with, and how much to the pure fee effect? Separating revenue shares from fee relatives using equation (7) provides an approximate answer. For GP's with 1-5

percent Medicaid caseloads, raising both Medicaid and Medicare allowables to usual fees would raise gross revenues 6.8 percent as follows:

$$6.8 = 1.1 \cdot (1.78 - 1) + 10.6 \cdot (1.57 - 1) \\ = 0.8 + 6.0$$

where 1.1 percent and 10.6 percent are the average Medicaid and Medicare revenue shares, respectively,

Table 7
Impact of raising Medicare and Medicaid allowable fees to simulated commercial fee limits by physician specialty and extent of Medicaid participation

Specialty and Medicaid participation rate	Δ Gross revenue		Net Income		Δ Gross revenue as a percent of net income	
	Medicaid (1)	Medicaid plus Medicare (2)	Medicaid (3)	Medicaid plus Medicare (4)	Medicaid (5)	Medicaid plus Medicare (6)
General practitioner						
Total	\$1,664	\$4,076	\$59,406	\$61,818	2.9	7.1
Less than 1 percent	0	3,647	54,420	58,067	0	6.7
1-5 percent	431	2,735	59,901	62,205	0.7	4.6
6-10 percent	1,956	4,447	59,601	62,093	3.4	7.7
11-20 percent	2,126	4,766	64,896	67,536	3.4	7.6
21-30 percent	4,943	7,504	63,274	65,835	8.5	12.9
31-50 percent	8,332	10,860	61,169	63,697	15.8	20.6
51 percent or more	7,501	9,729	57,351	59,579	15.0	19.5
General surgeon						
Total	4,089	8,382	75,592	79,885	5.7	11.7
Less than 1 percent	0	5,410	59,410	64,820	0	9.1
1-5 percent	710	5,599	74,480	79,369	1.0	7.6
6-10 percent	3,885	9,230	75,198	80,543	5.4	12.9
11-20 percent	4,381	9,278	76,964	81,861	6.0	12.8
21-30 percent	9,183	12,581	82,091	85,489	12.6	17.3
31-50 percent	22,046	26,587	104,122	108,663	26.9	32.4
51 percent or more	23,343	23,370	68,809	68,836	51.3	51.4
Internist						
Total	999	1,746	60,615	61,362	1.7	2.9
Less than 1 percent	0	1,289	53,115	54,402	0	2.4
1-5 percent	0	2,898	61,022	63,919	0	4.7
6-10 percent	0	-1,161	61,892	60,731	0	-1.9
11-20 percent	2,038	-1,537	65,998	62,424	3.2	-2.4
21-30 percent	6,707	7,360	69,690	70,343	10.6	11.7
31-50 percent	18,499	22,436	76,836	80,773	31.7	38.5
51 percent or more	13,907	14,951	68,125	69,170	25.6	27.6
Obstetrics and gynecology						
Total	3,686	5,856	75,481	77,652	5.1	8.2
Less than 1 percent	0	4,187	69,100	73,286	0	6.1
1-5 percent	1,661	3,570	75,897	77,807	2.2	4.8
6-10 percent	3,825	5,054	83,111	84,340	4.8	6.4
11-20 percent	6,812	8,441	72,090	73,719	10.4	12.9
21-30 percent	12,702	14,611	84,463	86,372	17.7	20.4
31-50 percent	22,157	27,055	96,159	101,056	29.9	36.6
51 percent or more	24,319	25,994	97,303	98,978	33.3	35.6
Pediatrics						
Total	1,732	1,884	56,444	56,596	3.2	3.4
Less than 1 percent	0	0	58,373	58,373	0	0
1-5 percent	635	635	55,054	55,053	1.2	1.2
6-10 percent	350	1,074	58,069	58,793	0.6	1.9
11-20 percent	-2,155	-569	52,370	53,956	-4.0	-1.0
21-30 percent	4,831	5,174	52,597	52,939	10.1	10.8
31-50 percent	7,150	7,348	56,746	56,943	14.4	14.8
51 percent or more	8,167	8,250	63,038	63,121	14.9	15.0

NOTE: Δ = increase in gross revenue.

for this group. Raising Medicare fees 57 percent to usual fees would explain almost 90 percent (6.0/6.8) of the revenue increase; however, raising Medicaid fees 78 percent would add almost nothing, because of miniscule Medicaid participation. (Usual, Medicare, and Medicaid fees for each specialty as a whole are shown in Table 1. Separate tabulations were made by extent of Medicaid participation for the calculations in the text.)

By comparison, consider the ELMP Medicaid GP whose gross revenues are simulated as follows to increase 27.8 percent under a Medicaid-Medicare fee increase to usuals:

$$27.8 = 54.7(.42) + 7.5(.65) = 22.9 + 4.9.$$

Raising Medicaid fees by 42 percent to usuals explains 80 percent of the increase; Medicare, only 20 percent. Of the nearly 23-percentage point increase in gross revenues attributable to higher Medicaid fees, slightly more than half is from heavy dependence on Medicaid and slightly less than one-half is from the fee increase. Large increases in Medicare fees, 65 percent or more, add little to ELMP income, because of the trivial numbers of Medicare patients.

Similar breakdowns for ELMP surgeons, internists, OB-GYN's, and pediatricians are as follows:

$$\begin{array}{lcl} \text{GS:} & 67.5 & = 53.2(1.19) + 8.4(.50) = 63.3 + 4.2 \\ \text{IM:} & 42.7 & = 37.2 (.90) + 21.0(.45) = 33.3 + 9.4 \\ \text{OB-GYN:} & 42.6 & = 62.6 (.64) + 4.2(.67) = 40.0 + 2.6 \\ \text{PED:} & 36.8 & = 74.0 (.49) + 0.6(.55) = 36.3 + 0.5 \end{array}$$

ELMP surgeons' gross incomes are simulated to increase by 67.5 percent, not so much because of their dependence on Medicaid (at least compared with most other specialties), but because of the heavy fee reductions they experience—119 percent on the average across office and hospital visits and operations, implying that usual fees for this group were 2.19 times the Medicaid payment. Internists' revenue increases would be far less than those of surgeons (albeit still a substantial 43 percent) because of their limited dependence on Medicaid fees. Roughly one-third of Medicaid patients seen by ELMP internists have joint Medicare coverage, making these physicians less dependent on Medicaid allowables. Conversely, ELMP OB-GYN's and pediatricians are relatively more dependent on Medicaid revenues, as Medicare plays practically no role in their practices.

Overall, for physicians running small Medicaid practices, raising Medicare fees explains the preponderance of any increase in incomes; and for those with large Medicaid practices, raising Medicaid fees explains about two-thirds of the increase, with the rest a result of Medicaid participation. Internists are a notable exception in that one-quarter of their higher incomes would still come from higher Medicare fees, even though 73 percent of their patients had Medicaid coverage.

Discussion

Physician complaints about heavy public program fee discounting, although probably overstated, are evidently true. Not only that, but Medicare, and especially Medicaid, pay lower rates than other private third parties. On the other hand, Blue Shield and commercial insurers also engage in heavy fee discounting, rendering Medicare and Medicaid reductions far less serious in terms of relative payments, if not usual charges.

Two immediate implications follow from this. First, because the Bureau of Labor Statistics, the Health Care Financing Administration, and most other groups use reported usual prices as indexes of inflation in physician services, it is likely that such indexes overstate both actual receipts and inflation rates, particularly given the greater fee discounting by insurers over time. Second, even though the use of list, or usual charges probably does make sense for most industries serving an uninsured population, it is suggested here that usual fees have little relation to actual average payments per service, particularly so for surgical procedures and among heavy public program participants. In fact, a good argument can be made that under widespread use of usual, customary, and reasonable (UCR) reimbursement methods, usual fees tend to lose all meaning, becoming an instrument in physicians' hands to maximize third-party payments. Insurers using UCR methods, on the other hand, must engage in complicated statistical manipulations to offset such incentives, with both sides participating in a revenue maximization-expenditure control game.

What implications Medicare and Medicaid discounting have for behavior, besides inducing higher charges, are unclear. If discounting has effectively reduced the relative marginal revenue product in the Medicare and Medicaid markets, physicians will substitute private for public patients (Mitchell and Cromwell, 1982a, 1982b; Mitchell, 1983; Cromwell and Mitchell, 1984; Held, Holahan, and Carlson, 1983). On the other hand, if physicians have been fairly successful in gaming the system by reporting higher-than-market usual fees, then little or no shifting should have occurred, *ceteris paribus*. Given the large apparent discounts reported in this article, discounts that are certainly larger today, it is noteworthy that as many physicians participate in Medicare and Medicaid as they do. As of 1980, more than 50 percent of Medicare bills were assigned (Ferry, et al., 1980) and 75 percent of physicians treated Medicaid patients (Sloan, et al., 1978; Mitchell, et al., 1981). Of course, this varies by State for Medicaid because of the substitution of stringent fee schedules for UCR methods in many places (Holahan, 1984).

How are physicians doing in a world of extensive Medicare and Medicaid discounting? General practitioners in extra-large Medicaid practices (ELMP's) showed the biggest discrepancy, with net incomes \$8,000-\$13,000 less than their peers in small Medicaid practices (SMP's), or about a 17-percent reduction. For the other specialists, the percentage reductions

were usually less. These differences, while significant, were quite a bit less than what we expected given intensive participation in Medicare and Medicaid and their low allowables.

On decomposing net incomes, we found that ELMP physicians were partially offsetting their lower average revenues through increased productivity and not by skimping on other inputs. ELMP OB-GYN's, for example, reported seeing 2.9 patients per hour versus about 2.5 per hour in SMP's. What implications this might have for patient quality is another question. Surprisingly, no associated increase in work effort was found; indeed, for most specialties, heavy Medicaid participants reported working fewer hours per week and year. Extensive discounting by other third parties, whose payments make up a large part of SMP revenues, also narrows the discrepancy. Thus, it would appear that net incomes of physicians do not suffer as much, or are as sensitive to, Medicare and Medicaid fee discounting as one might expect when just looking at the size of the discount.

Taking the physician's usual fee at face value and eliminating all Medicare and Medicaid fee discounting, the short-run effects would be as follows:

- Windfall gains on the order of 20 percent for most physicians, ranging up to 100 percent for general surgeons with Medicaid-dominated practices.
- A radical restructuring of the income distribution among small and large Medicare and Medicaid physicians with larger-than-average incomes flowing to public sector practitioners.
- Major restructuring of the physician services market with much heavier participation, private insurers raising allowables to compete with public programs, and (possibly) backward bending supply as specialist incomes are driven up well in excess of \$100,000. Whether a major upgrading of the Medicare and Medicaid fees would eliminate artificial growth in usual fees in subsequent years and significantly improve access is unknown. Few natural experiments exist because States are reluctant to pay physicians more when Medicaid budgets are skyrocketing. Massachusetts may be a possibility in that it has recently doubled its rates on office visits.

In the final analysis, whether physicians have been materially harmed by low public fees depends on how well they have been doing relative to other professionals. As high as their current incomes are, it is possible

they should be higher still, given the extra out-of-pocket and opportunity costs associated with their long, arduous training period. It has been found elsewhere (Burstein and Cromwell, 1985), that during the 1963-79 period, the rate of return to basic medical training ranged from 12 percent to 19 percent. No steady trend in this rate of return over time was evident, and it certainly has not fallen during the first 15 years of Medicare and Medicaid. Returns to additional specialty training (1967-78) were always strongly positive for internists, general surgeons, and OB-GYN's as well, in spite of extensive Medicare and Medicaid discounting of surgical charges and special procedures. It would appear that, for many specialties, the basic economic problem is not that Medicare and Medicaid fees are too low. Rather, allowables of other insurers are too high in the sense that these fees are unnecessary to bring forth the desired supply of physicians services; and they exacerbate income differences across specialties and between physicians and other highly educated professionals.

Technical note

Income adjustments and outlier screens

There are several reasons why discrepancies may exist between calculated net income (GR-TC) and reported net incomes. First, errors may be present in the practice cost calculations that enter into the decomposition equation. Total physician practice costs were estimated by summing the following costs: office, equipment, supplies, and automobile costs; malpractice insurance; and physician and employee salaries.

Second, a problem arises when income data (gross and net) are reported within ranges and interval midpoints are used to approximate reported incomes. Discrepancies appear when a physician's actual income does not coincide with these midpoints. For example, a \$50,000 discrepancy is possible if an incorporated physician reports his gross income within the \$400,000-\$500,000 range when, in fact, his actual gross income is \$400,000. By calculating net income as a residual (GR-TC) and then comparing it with the reported value, either or both the gross and net incomes were moved to the endpoints of the allowable range.

Approximately 20 percent of the sample were missing gross revenue and/or net income values. Replacement values for the missing data had to be calculated. Gross revenue was estimated by the following reduced-form equation:

$$GR = f(GS, IM, PED, OBGYN, SOLO, LARGE, URB1, URB2, URB3, URB4, PREPAID, FTEMPLOY, FULLTIME, WORKWKS, TIME),$$

where GR = gross revenue (for incorporated or unincorporated practice),

GS	= general surgeon = 1, 0 otherwise,
IM	= internist = 1, 0 otherwise,
PED	= pediatrician = 1, 0 otherwise,
OBGYN	= obstetrician-gynecologist = 1, 0 otherwise,
SOLO	= single physician practice = 1, 0 otherwise,
LARGE	= practice with more than 6 full-time physicians = 1, 0 otherwise,
URB1	= county size 3,500,000 = 1, 0 otherwise,
URB2	= county size 1,400,000 - 3,499,999 = 1, 0 otherwise,
URB3	= county size 250,000 - 1,399,999 = 1, 0 otherwise,
URB4	= county size 50,000 - 249,999 = 1, 0 otherwise,
PREPAID	= physician services prepaid = 1, 0 otherwise,
FTEMPLOY	= number of full-time employee per physician,
FULLTIME	= number of full-time physicians,
WORKWKS	= number of weeks worked by physicians,
TIME	= 1977 = 1, 1976 = 0.

The reduced-form equation for net income includes the variables listed above, in addition to a gross revenue (GROSREV) variable. If a sample observation were missing both gross revenue and net income values, gross revenue was estimated first then entered into the next income equation.

The equations were estimated in linear form using ordinary least squares (OLS) regressions. The estimated coefficients are shown in Table 8. Replacement values for gross revenues and net incomes were calculated by taking a weighted sum of the variables using their estimated coefficients as weights.

Net income decomposition requires accurate measures of many practice variables. Outliers in terms of physician practice hours, number of visits, net and gross revenues, and calculated net income were either dropped or set equal to a specific value to minimize remaining inaccuracies in the decomposition method.

Hours per week were subject to two limits. If a physician reported practice hours totaling more than 80 hours per week, the observation was set equal to 80 hours; whereas if less than 20 hours per week were reported, the observation was dropped from the

sample. Less than 5 percent of the 1,059 physicians in solo practices reported fewer than 20 hours or more than 80 hours. Less than 1 percent of those in the group practice sample reported having fewer than 20-hour work weeks, and 5 percent claimed more than 80-hour work weeks.

Visits were limited to 25,000 per physician per year, and any observation greater than 25,000 was dropped from the sample. This resulted in the deletion of less than 5 percent of the 804 group practices sampled and 1 percent of the solo practice observations. Total visits per week were limited to 500. Those physicians who had weekly visits totaling more than 500 were set equal to 500 visits.

Gross revenues per visit were limited to \$150. Less than 0.4 percent of the solo practices reported gross revenues greater than this value. The maximum value for the group practice sample equaled \$90.58, thus requiring no deletion of observations.

Net revenues per visit were limited to the range \$1.00-\$100. Any outliers were dropped from the data base. Fewer than 5 percent of the solo practices recorded net revenues less than \$1.00 and 1 percent of these physicians generated net revenues of more than \$100. The highest net revenue per visit reported by any group practice was \$72.57. Less than 1 percent of these group practices had net revenues under \$1.00.

Finally, calculated net income values (GR-TC) were limited to \$250,000 for solo practices and \$300,000 for group practices, i.e., the upper limits of reported net incomes. Fewer than 1 percent of the solo sample and 0.3 percent of the group sample were deleted for exceeding these limits.

Simulation adjustments

A few additional refinements to equation (7) were necessary before carrying out the simulations. First, public participation rates, MV/V and MCV/V, had to be adjusted for overlapping insurance coverage.

Next, to adjust for surgical mix, all fees needed to be averaged over office and hospital visits plus operations, using visit and operation shares as weights. Medicare and Medicaid fee reductions appear to be greater for surgical procedures, so that raising public fees across the board should affect general surgeons and OB-GYN's more than physicians in the other three specialties. GP's, internists, and pediatricians were not asked their typical surgical fee so the surgeon's hernia repair fee, by insurer and extent of Medicaid participation, was used as a proxy.

Gross revenue shares from office and hospital visits versus operations tend to be quite sensitive to the reported number of operations because surgical fees are typically 30-50 times more than visit fees. Our reported operations figures based on the HCFA and NORC surveys would have surgeons and OB-GYN's performing 8-10 a week, which is considerably above the average reported elsewhere (American College of Surgeons, 1975). Because our figures also include surgical assists, for which the physician would be paid only a fraction of his usual fee, the true operations

Table 8
Regression results for gross revenue and net income replacements

Variables	Gross revenue (Incorporated)	(t)	Gross revenue (Unincorporated)	(t)	Net income	(t)
GS	\$34,772	(2.1)	\$20,475	(6.2)	\$11,309	(9.6)
IM	1,975	(0.1)	8,313	(2.5)	3,728	(3.1)
PED	-47,028	(2.8)	582	(0.2)	-1,186	(1.0)
OBGYN	54,111	(3.5)	17,932	(4.9)	8,436	(7.1)
SOLO	-4,609	(0.3)	-4,907	(0.6)	-11,654	(14.4)
LARGE	73,346	(2.3)	-40,776	(2.4)	2,480	(1.3)
URB1	30,332	(1.9)	-6,274	(1.8)	214	(0.2)
URB2	25,807	(1.7)	-4,124	(1.2)	-752	(0.6)
URB3	26,149	(1.8)	-3,921	(1.2)	643	(0.6)
URB4	24,756	(1.7)	4,125	(1.2)	1,286	(1.1)
PREPAID	31,064	(1.4)	6,973	(1.1)	882	(0.5)
FTEEMPLOY	38,901	(10.9)	6,754	(12.0)	96	(0.4)
FULLTIME	112,784	(18.5)	7,475	(2.1)	—	—
WORKWKS	-3,101	(1.7)	382	(1.0)	58	(0.4)
GROSREV	—	—	—	—	.19	(33.8)
TIME	38,495	(3.9)	6,057	(2.7)	-199	(0.3)
CONSTANT	-21,766	(0.2)	31,585	(1.2)	33,956	(4.5)
R ²	.46		.11		.36	
DOF	2103		1878		3919	
F	119.4		16.64		148.35	

¹Variables are defined in the Technical note.

NOTE: t statistics in parentheses.

workload for all physicians was reduced by 40 percent, making the results more consistent with other sources.

A final adjustment was made for ancillary revenues received by GP's, internists, and pediatricians. This was done by weighting office revenues by $ADJ = 1 + ANC_j \cdot (GR_a/OR)$, where ANC_j = proportion of gross revenues derived from ancillaries by the j th specialty, and OR = office visit revenues. We set $ANC = .09, .15$, and $.06$ for GP's, internists, and pediatricians, respectively, based on Ernst (1976). According to that study, surgeons and OB-GYN's generated only negligible earnings from ancillaries. Because Ernst's figures are in terms of gross revenue percentages, the adjustment to office visit revenue shares must be greater where nonoffice activity occurs.

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