

Paying for Physician Services Under Medicare and Medicaid

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THIS PAPER REPORTS the results of recently completed research on Medicare and Medicaid reimbursement for physicians' services in California. Our general objective was to investigate the relationships between physicians' behavior and two critical health policy goals: 1) controlling the rate of increase in the costs of physicians' services; and 2) assuring an adequate supply of care to beneficiaries of publicly financed health programs.

The project was divided into four specific studies, which are summarized in this paper. In the first study, we examined variations in charges and reimbursement rates between programs and between geographic areas within California. Do physicians bill Medicare, Medicaid, and private patients different amounts for the same service? What is the extent of geographic variation in physicians' fees and reimbursements?

In the second study, we analyzed changes in indexes of actual charges, reimbursement rates, service complexity, service volume, and revenues in both Medicare and Medicaid over the period 1972-1975. Our main objective was to determine if there were differences in prices and patterns of service delivery between price control (1973, 1974) and non-control (1975) years.

In the third study, we developed and estimated an econometric model of physicians' price and output decisions, with particular

emphasis on the effects of private charges and Medicare and Medicaid reasonable charges on the quantities of services provided to Medicare assignment and Medicaid patients.

In the fourth study, we focused on physicians' decisions to participate in Medicaid. We used econometric methods to study the effects of private fees and Medicaid reimbursements on participation rates, the number of Medicare patients per participating physician, and the quantity of services per Medicaid patient.

Background

Several basic principles of current Medicare and Medicaid reimbursement systems should be described before beginning this summary of our research. Physicians are reimbursed for their services under Medicare on the basis of their customary, prevailing, and reasonable charges. The physicians' median charge is designated as their "customary charge," while the 75th percentile of the median charges of all physicians in a geographic area is referred to as the "prevailing charge." (California Blue Shield, the Medicare carrier, uses charge data from Medicare, Medicaid, CHAMPUS, and their private business to calculate customary and prevailing charges.) The "reasonable charge" for a service is the minimum of the actual charge, the customary charge for this procedure in the calendar year preceding the current fiscal year, and the prevailing charge in the same prior period. In this summary, we refer to physicians' charges to the program as "actual charges" and the payment rate determined by Medicare as the "reasonable charge."

Physicians have two options for obtaining payment in Medicare. First, they may assign the claim, that is, submit their bill directly to the Medicare carrier for their area. After they assign the claim, physicians are reimbursed at 80% of the reasonable charge for the service, if the patient's deductible has been satisfied. Physicians thereby agree to accept the reasonable amount as full payment for their services; in turn, they must bill patients for their obligation.

The second option of physicians is to bill on a non-assigned basis, that is, bill patients directly and expect payment of the full amount of the bill. Patients then secure reimbursement from Medicare by submitting a claim to the carrier, which pays patients 80% of the reasonable amount less any unpaid deductible.

The California Medicare program uses a reimbursement system structurally similar to Medicare's. Additional controls imposed by the state, however, resulted in considerable divergence between the fees paid by the two programs. For each claim submitted to Medicaid, the carrier pays the physician 100% of the reasonable charge. The reasonable charge is the minimum of the actual charge, the usual charge (Medicare's customary), and the customary amount (Medicare's prevailing). While the usual and customaries are computed identically to Medicare's customary and prevailings, the charges used are from calendar year 1968 rather than the prior year. In July, 1972, usual and customary charges for all procedures were increased 2.5%.

The project's primary data source was all claims paid by the Medicare and Medicaid programs during the last quarter of each of 4 fiscal years (1972-1975) to a sample of 5003 physicians in the state of California. Sample physicians were drawn from 11 specialties and were distributed throughout the state. Most of the research in this project was based on analysis of five specialties: 1396 general practitioners, 786 general surgeons, 942 internists, 263 obstetricians-gynecologists, and 247 pediatricians. Because one of our objectives was to examine changes in services over time, it was important to eliminate physicians whose service patterns would be interrupted by changes in location or practice mode. Therefore, all sample physicians were in the same practice location during each of the 4 years. Furthermore, the sample was limited to solo-practitioners because it was not possible to identify billings of individuals within a group. The claims record allowed us to identify for each physician the date of service, procedure code, the patient ID number, the actual charge, and the amount paid for each procedure performed. Two other files containing data on physicians' unusual (Medicare customary) and customary (prevailing) charges were attached to the physicians' record for each claim.

Summaries of Individual Studies

There has been increasing concern in recent years over various disparities and inequities in Medicare payments to different physicians for the same service. Also of concern are the apparent differences in charges between the three classes of patients covered

by public financing programs: Medicaid, Medicare assignment, and Medicare non-assignment. To provide data pertinent to these issues, we conducted a series of studies in California (see Bluck and Lee, 1977; Lee and Holahan, 1978; Scanlon and Bluck, 1977).

Analysis of Inter-Program and Inter-Regional Fee Variations

Our first study investigated the following questions:

1. How much do average charges vary within Medicare for assigned and non-assigned services, and between Medicare and Medicaid?
2. Why do average charges vary from program to program?
3. Do physicians bill each program differently?

Examination of 25 of the most frequently performed procedures for 1975 revealed that actual charges for non-assigned Medicare services were, on average, 5% higher than for assigned Medicare services, and 7% higher than for Medicaid services. It is important to note, however, that there were a number of exceptions to these patterns. For some procedures, Medicaid and assigned Medicare bills exceeded those for non-assigned Medicare. Such exceptions were most likely to occur among less frequently performed procedures or surgery and pathology procedures.

The observed inter-program differences may be explained in two ways. First, physicians may submit different charges to each program. Second, physicians with higher-than-average fees may be less willing to accept assignment than physicians with below-average fees. To test the first hypothesis, we constructed ratios of actual charges to each program by individual physicians. In general, the observed differences between programs were quite small, never exceeding 0.8% (all specialties). Clearly, differential billing by individual physicians cannot explain inter-program differences in average charges. The main conclusion was that differences in average charges among programs are due to differences in the composition of physicians participating in those programs.

We also concluded that individual physicians with high average fees are less likely to accept assignment or to participate in

Medicaid. In addition, a smaller proportion of physicians in high fee areas (usually urban counties) accept assignment than in low fee areas. Overall, rural physicians and those in general practice or general surgery are most likely to accept assignment. These patterns presumably reflect differences in the private demand for services and the unit costs of providing care.

Percentages of Medicare claims assigned were 60% for general practitioners, 56% for general surgeons, and 40% for internists. These are comparable to assignment rates cited in other studies. Since assignment is mandatory for patients eligible for both Medicare and Medicaid, variations in the rate of mandatory assignment may explain much of the variance in total assignment rates, both among localities and among specialties. To evaluate this question, we calculated assignment rates after removing joint Medicare-Medicaid claims from the sample. Assignment rates fell to 33% for general practitioners, 37% for general surgeons, and 22% for internists. This suggests that physicians are much less willing to accept assignment voluntarily than is commonly assumed.

A second phase of this study examined urban-rural variations in Medicare and Medicaid reasonable charges. Two basic issues were addressed:

1. How great was the dispersion among average reimbursement levels between urban and rural areas in California?
2. Did inter-area differences in reimbursement rates tend to increase or decrease over time?

The results demonstrated considerable dispersion in mean Medicare reasonable charges among the five regions we examined (large urban-north, large urban-south, small urban-north, small urban-south, and rural). In 1972, the gap between the highest and lowest reasonables ranged between 12% and 20%, depending on specialty. In 1975, the difference ranged between 19% and 30%. Medicare reasonable charges in 1972 tended to be highest in large urban areas and lowest in rural areas. For example, in large northern counties, reasonable charges exceeded the average for the state by 9.5% for internists. Reasonable charges in rural counties were below the state average by 3.2% for general practitioners, 9.2% for general surgeons, and 12.9% for internists. The largest reasonable charge increases between 1972 and 1975 occurred in large urban counties.

Consequently, the disparity in reasonable charges levels between large urban counties and other areas tended to increase over time.

The reasonable charge indexes described in the preceding paragraph were decomposed into an average reasonable charge per California Relative Value Scale (CRVS) unit and the average number of CRVS units per service. The former may be interpreted as a measure of the price per homogeneous output unit, while the latter is a measure of service intensity. This permits analysis of whether differences in levels or rates of change in reimbursements are due to variations in pure prices or in service composition. After stratifying physicians by area and specialty, we found that increasing service intensity explained most of the growth in average reasonable charges per claim.

Medicaid data revealed that, in 1972, reasonable charge levels were usually highest in large urban counties and lowest in rural counties. Reasonable charges increased faster than average in both large urban and rural counties for all specialties. As a result, in 1975, large urban areas still had the highest reasonable charges, but reasonable charges in rural counties also exceeded state-wide averages. Changes in service composition contributed most to increases in average reasonable charge levels in both large urban and rural counties in every specialty.

Further investigation revealed that differences in average charges between programs and areas are small relative to differences among individual physicians within regions and within programs. The standard deviation of billed charges for a given program and region was used to measure inter-physician variations. It was generally much larger than either inter-program or inter-regional differences. For example, the coefficients of variation for three categories of physicians' visits generally fall between 0.2 and 0.35, with maximum coefficients for some procedures approaching 0.5 and minimums near 0.10. These indicate a large area of overlap in the charge distributions of different programs and different regions. Similar results emerged for surgery, pathology, and other types of procedures. Exploratory analysis of inter-specialty differences in charges for the same procedures showed the same result—much larger differences within than between specialties.

These findings suggest that equalizing fees by procedure will have a much larger impact on individual physicians' revenues than requiring that average fees across areas or specialties be equal. It

should also be pointed out that, because physicians in rather large regions were analyzed together, nothing should be inferred from the magnitude of the coefficients of variation about the presence or absence of price-fixing or collusion among physicians. These issues were beyond the scope of the study.

Finally, the study demonstrated the risks involved in analyzing physician pricing and service delivery patterns with only a small number of individual procedures. Physicians appear to vary considerably in the relative proportions of different procedures they provide and in the definitions of the services they perform. Thus, to analyze physicians' prices adequately, it is critical to examine a large sample of procedures.

Price Controls, Physician Fees, and Physician Incomes from Medicare and Medicaid

The project's second study examined effects of the price controls imposed by the Economic Stabilization Program (ESP). The analysis was based on Medicare and Medicaid claims paid to over 3600 physicians from 1972 through 1975. We examined actual charges, reasonable charges, procedure composition, and the number of services provided (see Holahan and Scanlon, 1978).

Four interrelated issues were raised by the experience with price controls:

1. How did the price controls affect physicians' billing behavior (actual charges) and the course of prices paid (reasonable charges)?
2. Were there shifts in billings among procedure codes available for related procedures? For example, California physicians may bill for five types of new patient office visits and seven types of established patient office visits. Did the relative frequencies of billing for procedure subcategories change over time?
3. What were physicians' Medicare and Medicaid supply responses to the controls?
4. How did changes in reimbursement rates and changes in service volume affect physicians' Medicare and Medicaid receipts?

Although the Economic Stabilization Program was not designed to control total payments to physicians, the experience under that program provided information on the effects of fee controls on limiting spending for physicians' services. Annual data by program and specialty were used to compare price control (1972-1974) and non-control (1975) years; the data used for this comparison were from the second calendar quarter (April-June) of each of the 4 years. Medicare and Medicaid were analyzed separately.

The main conclusion of our investigation of Medicare data was that price controls were successful in controlling the rise in physicians' fees. They were not successful, however, in constraining the rate of increase of Medicare expenditures for physicians' services. Reasonable and actual charge indexes based on *initial year weights*, i.e., a constant mix of services over the 4 years, showed that rates of increase were generally held around the ESP target of 2.5% per year. This was also the case for reasonable and actual charges per CRVS unit. However, indexes based on *current year weights*, which permit the relative importance of different procedures to shift from year to year, clearly indicated that both actual and reasonable charges increased significantly faster than hoped for. This was due, in part, to small increases in service intensity, as physicians performed and billed for a more complex mix of office and hospital visits.

Medicare expenditures grew at a steady rate throughout the period. The most important source of increase was substantial growth in the number of services. Comparison of 1972 and 1973 showed an increase of 9.4% for general practitioners, 10.9% for general surgeons, and 8.7% for internists. Comparison of 1973 and 1974 showed that the number of services had increased by 8.4% for general practitioners, 9.5% for general surgeons, and 14.6% for internists. In general, office visits, laboratory tests, and electrocardiograms increased the most. The net result was that payments from Medicare to our sample physicians grew more during the 2 years of price controls than in the year after. In 1972, the first year of controls, gross revenues of general practitioners, general surgeons, and internists increased by 11.9%, 10.1%, and 12.0%, respectively. In the second year of controls, gross revenues increased by 12.4%, 15.6%, and 19.3%, respectively. Most of the growth in revenues in these 2 years is explained by increases in the number of services.

In 1975, the year following ESP's end, increases in the

reasonable charges were responsible for the growth in Medicare payments. Between 1974 and 1975, average reasonable charges for all procedures grew by 13.5% for general practitioners, 10.2% for general surgeons, and 9.1% for internists. The corresponding increases in actual charges were much larger, 22.9%, 22.5%, and 23.9%, respectively. At the same time, the growth rate in the quantities of Medicare services fell sharply. General practitioners actually supplied 9.3% fewer Medicare services, while the increases for general surgeons and internists fell to 1.6% and 3.1%, respectively. The end result was an increase in incomes from Medicare in 1975 of 3.6% for general practitioners, 9.1% for general surgeons, and 2.5% for internists.

Our results are limited to the effect of the ESP controls on prices and services provided to Medicare beneficiaries. We do not know if these results are indicative of a general increase in physicians' services and incomes during this period or whether they reflect an expansion of services to Medicare patients only. There is no information on changes in fees paid by privately insured individuals, so we cannot determine if they became more or less attractive to physicians during ESP. Medicare beneficiaries are better insured for office visits and laboratory tests, the most important source of increase in services, than are privately insured individuals. If this is true, physicians' total incomes may have increased less rapidly than the rates we observed for Medicare.

The ESP program had little or no impact on the fees paid by the California Medicaid program. Medicaid fees were effectively controlled prior to ESP because charge screens were based on calendar 1968 charge data, with the only adjustment in the period being a 2.5% increase in July, 1972. Interpretation of the Medicaid experience is also complicated by California's imposition of a prior authorization requirement and patient cost-sharing for many physicians' services. The state also introduced a centralized eligibility identification system in July, 1971. Thus, changes in service intensity, service volume, and Medicaid payments will reflect the impact of these controls, the continued freeze on Medicaid fees, and any effects that the general ESP controls had on physician practice patterns.

Average Medicaid reasonable charges showed little or no increase for 1973 and 1974, but increased considerably in 1975. Because fees were still under strict controls, average rates can only

change if the composition of participating physicians changes. Thus, it appears that physicians with low usual charge screens tended to reduce participation. In addition, Medicaid policies appear to have resulted in a decline in the participation of general practitioners and an increase in the delivery of services by obstetrician-gynecologists (Ob-Gyns) and pediatricians. There was a significant increase in revenues for general surgeons, Ob-Gyns, and pediatricians in 1974. General surgeons and Ob-Gyns exhibited strikingly large increases in visits and tests per surgical procedure. Payments to all specialties increased in 1975. This was due to increases in average fees and to a general increase in the volume of services. A 9% increase in Medicaid eligibility in 1975 probably contributed to the growth in service provision.

Econometric Analysis of Physicians' Price and Output Decisions

This study continued the investigation of physicians' charges and supplies of services to the Medicare assignment and Medicaid programs. Formal economic modeling and econometric estimation were the principal analytic techniques. Four specific issues were investigated:

1. What is the impact of Medicare and Medicaid reimbursement *levels* on physicians' fees?
2. Does Medicare's *method* of computing reasonable charges affect the level of physicians' actual charges?
3. How sensitive are the supplies of services for Medicare assignment and Medicaid patients to variations in actual charges, Medicare, and/or Medicaid reasonable charges?
4. What was the impact of the Economic Stabilization Program on physicians' actual charges, and on Medicare assignment and Medicaid outputs?

The empirical analysis was guided by two relatively simple, theoretical models that addressed the following issues implicit in physicians' price and supply decisions: At what level should fees be

set, given that Medicare and Medicaid reasonable charges may be treated as price “floors”? How should fees be set in the current year, given that next year’s Medicare reasonable charges depend on this year’s actual charges? How should output, i.e., medical treatments, be allocated among Medicaid, Medicare assignment, and private patients?

The sample used in this analysis consisted of northern California physicians in general practice, general surgery, or internal medicine from 1972 through 1975. Service mix differences among physicians and over time were accounted for by using the CRVS unit as the measure of output and converting individual procedures to the medicine scale. Actual and reasonable charges were then measured in dollars per CRVS unit.

The statistical analysis had three major components: estimation of an equation explaining physicians’ fees; estimation of supply equations for Medicare assignment and Medicaid outputs; and evaluation of the effects of the Economic Stabilization Program on both actual charges and quantities supplied. The fee equation related the physician’s actual charge per CRVS unit to a number of supply and demand factors: his/her Medicare and Medicaid reasonable charges per CRVS unit, years of experience, foreign medical education status, and area-wide measures of physician supply, wages for physicians’ office employees, malpractice insurance premiums, and rates of change in wage rates and Medicare reasonable charges (see Lee and Hadley, 1979).

Medicare assignment and Medicaid outputs (total number of CRVS units) were the dependent variables in the supply functions, with both actual and program reasonable charges included among the independent variables (see Hadley and Lee, 1978). Actual charge was used as a proxy for the demand for care from private patients, while the reasonable charge represented the fiscal inducement provided by the public program. Other factors in the supply model included the physicians’ experience and foreign medical education status, and area-wide variables similar to those in the fee equation.

Explaining the quantity of Medicare services provided on a non-assigned basis required information on the demand for services by both the elderly and non-elderly and was beyond the scope of the study. The parameters of the price equation were estimated by applying multiple regression analysis to all physicians in the sample while controlling for program participation status. The Medicare

assignment and Medicaid supply functions, however, could only be estimated from samples of physicians who participated in each program.¹

Finally, the investigation of ESP's effects had two parts (see Hadley and Lee, 1979). The first was statistical tests of whether price and supply function parameters differed between the price control and non-control years. The second simulated what private charges and Medicare assignment, and Medicaid services would have been in the absence of ESP.

The findings of this phase of our study will be summarized by stating several policy-relevant questions and then reporting the pertinent results. It should be emphasized again that, strictly speaking, these statistical estimates apply only to northern California general practitioners, general surgeons, and internists. The more general behavioral results may have broader applicability, however. Our first question was:

1. How do changes in Medicare and Medicaid reasonable fees affect physicians' billed charges?

A clear implication of the theoretical model used was that an increase in the Medicare reasonable fee would lead to an increase in private charges.² Because the Medicaid reasonable fee is generally smaller than the Medicare reasonable fee, it was less clear what the impact would be of raising the Medicaid fee, holding other factors constant. Our presumption was that such an increase would have a positive though smaller effect on the private fee than would a similar increase in the Medicare reasonable fee. We also hypothesized that the magnitude of the price effect would be larger for participating physicians in each of the programs.

¹This phase of our project did not explicitly analyze the decision to participate in a program. Medicaid participation rates at the county level are discussed in following sections.

²This occurs because both the Medicare and Medicaid reasonable fees are essentially equivalent to demand subsidies, since the two programs may frequently offer fees higher than what some program eligible would be willing to pay in the programs' absence. Therefore, an exogenous increase in the programs' fees will lead to higher private prices. This effect should not be confused with the inter-temporal link in Medicare between current reasonable fees and the preceding year's fees charged.

These predictions are based on the notion that physicians who participate in a fixed-fee program treat an exogenous increase in the program reasonable fee as an upward shift in demand. The higher reasonable fee makes it more attractive to treat program eligibles. One way for physicians to reorient their practices toward treating more Medicare assignment or Medicaid patients is to raise fees charged to private patients. If this should discourage some private patients from obtaining care, leaving empty appointment times, physicians can refill their schedules with publicly insured patients. Thus, the increase in the program reasonable fee permits the physician to raise private fees without adversely affecting overall practice profitability.³

The coefficient estimates for the Medicare and Medicaid reasonable fee variables in the price equations generally supported our hypotheses for all three specialties. (Separate fee equations were estimated for each specialty.) The Medicare reasonable fee coefficients ranged from 0.968 to 1.018 for physicians who accepted Medicare patients on assignment, and from 0.894 to 1.145 for non-participating physicians. The Medicaid fee coefficients were smaller in value, but still positive and statistically significant. They ranged from 0.446 to 0.668 for physicians who participated in Medicaid, and between 0.246 and 0.434 for non-participants. All coefficients were statistically significant at the 1% confidence level.

These results suggest that a large share of any exogenous increase in the Medicare or Medicaid reasonable would result in an increase in prices charged to all patients. For example, a 10% increase in the average Medicare reasonable would lead to a jump in average actual charges of between 7% and 8%. This might occur, for example, if Medicare provided a bonus of, say, 5% on all customary charges in order to increase physicians' willingness to accept Medicare claims on assignment. Medicaid fees go up as the state periodically updates Medicaid reimbursement rates. For reasons explained more fully elsewhere, however, we believe that these estimates may overstate the true impact such charges have on private

³Note that we do not suggest that physicians with private fees greatly in excess of program reasonable fees will necessarily be affected by increases in program reasonables. Such physicians tend not to have many Medicare patients and will be unlikely to be responsive to changes in relative prices.

fees (Lee and Hadley, 1979).⁴ Thus, while both the theoretical and empirical evidence strongly supports the notion of a positive pass-through, the magnitude of this effect is likely to be smaller than these estimates implied.

2. What effect does Medicare's *method* of determining reasonable fees have on physicians' prices?

It has frequently been argued that Medicare's method of determining reasonable charges has a built-in inflationary bias, since next year's Medicare reasonables depend on this year's actual charges. Our theoretical model implied that, if physicians understand how the Medicare system operates and if they expect that next year's reasonable charges will be lower than desired, they will increase current actual charges.

The hypothesis was tested by including in the price equations a variable that measured the *lagged* rate of change in each physician's Medicare reasonable fee per CRVS unit.⁵ Its hypothesized sign was negative, since an expectation of a high future reasonable fee would lead physicians to increase current fees charged by less than they otherwise might have. This variable had the correct sign for all three specialties and was statistically significant for two of them. Since this is a proxy variable, one cannot draw quantitative inferences from the parameter estimates themselves. However, this finding supports the belief that physicians understand the implications of Medicare's method of reasonable charge determination, and that this system has an inherent inflationary bias.

⁴The difficulty in interpreting the magnitude of the Medicare reasonable fee coefficients arises because this is a reduced-form equation. Ideally, we would like to estimate a structural equation that includes the physician's self-determined implicit wage as an explanatory variable. This is not possible, however, since the implicit wage is not directly observable. Therefore, the Medicare reasonable fee, which depends in part on prices charged in an earlier period, indirectly includes the effects of variations in physicians' unobserved implicit wage.

⁵This variable was defined as $(R_t - R_{t-1})/R_{t-1}$, where R_t represents the Medicare reasonable fee in period t .

3. Are the supplies of services to Medicare assignment and Medicaid patients sensitive to variations in private and program fees?

It was predicted that the higher the physician's private fee, the smaller the quantities of services provided to beneficiaries of fixed-fee public programs, i.e., Medicare assignment and Medicaid. Higher actual charges likely reflect both greater demand from private patients and higher office expenses per unit of output. Both of these factors were hypothesized to lead to lower levels of Medicare assignment and Medicaid output. Increases in program reasonable fees, on the other hand, should induce physicians to expand the quantities supplied to program beneficiaries, and thus increase the availability of care from private, office-based physicians.

These hypotheses were tested by estimating supply functions that included among the independent variables both the actual fees of physicians and the reasonable fees of relevant programs. Control variables in the supply equation were physicians' specialties, years of experience, and foreign medical education status, and county-wide proxies for physicians' office expenses and the availability of Medicare assignment and Medicaid patients.

The predicted negative relationships between the actual charge variable and Medicare assignment and Medicaid quantities were confirmed. The negative and statistically significant coefficients implied that a 10% increase in physicians' private charges relative to Medicare and Medicaid reasonables would reduce the quantities of services supplied to those programs by about 14% and 9%, respectively. An increase in actual charges relative to Medicare reasonable fees may also cause a substitution of non-assigned for assigned billing.⁶ While the quantitative estimates may not be generalizable to the entire nation, the results strongly suggest that increases in the fees physicians are able to charge private patients will substantially reduce the supply of services to Medicare assignment and Medicaid if other factors, particularly program fees, do not change.

⁶The decision to assign Medicare claims was not investigated in this phase of our research. Note that we analyze the output response only for participating physicians. Others are likely to be less responsive. (See Hadley and Lee, 1978.)

Statistically reliable estimates of the effects of Medicaid and Medicare reasonable fees on the quantities supplied were more difficult to obtain. The estimates were generally positive as predicted, but attained statistical significance only in the Medicare assignment supply function. The Medicare reasonable fee coefficient suggested that Medicare assignment output is quite responsive to increases in Medicare reasonable fees: a 10% jump in the reasonable would induce a supply response of between 12% and 14%. This is about the same as the negative supply response to an increase in private fee.

The Medicaid reasonable fee coefficient was much smaller. A 10% increase in the Medicaid fee would increase Medicaid output by less than 1%. This implies that the Medicaid fee is so low relative to price charged that office-based, solo-practice physicians treat Medicaid patients only out of charity considerations.⁷ As physicians' private fees rise, however, charity becomes more expensive.

4. Do participating physicians differ from non-participating physicians in the two programs?

A number of predictions regarding differences between participating and non-participating physicians were generated: 1) participating physicians should have lower actual charges; 2) physicians who participate in Medicaid should also participate in Medicare assignment, but not necessarily the reverse; and 3) physicians who participate in Medicaid should provide more services to Medicare assignment patients than do physicians who participate in Medicare assignment, but not Medicaid. These hypotheses are based on the premises that physicians prefer to treat patients for whom they can receive higher fees and, second, that they will treat lower fee patients only after exhausting potential demand at higher fee levels.

We compared actual charges and Medicare and Medicaid output levels for participating and non-participating general prac-

⁷An alternative scenario is that of the "Medicaid mill," which allegedly reduces the quality of care and bills for unnecessary services. This type of behavior is also not likely to be sensitive to small changes in Medicaid fees. However, this explanation is not likely to be very relevant for our data, since our sample was drawn to exclude group practices, partnerships, and ambulatory clinics.

tioners, general surgeons, and internists in both programs (Lee and Hadley, 1979:15). With one exception, non-participants' actual charges per CRVS unit were always larger, by between 3.5% and 9.4%. There was no difference in the actual charge per CRVS unit between Medicaid participating and non-participating general surgeons. Further, physicians who treat only Medicare non-assignment patients generally had the highest charges, while Medicaid participants tended to have the lowest charges.

Simple frequencies of Medicare and Medicaid output levels revealed that a substantial number of physicians (40.7%) provided fewer than 500 CRVS units of services per quarter to Medicaid. This corresponds to between eight and 12 patients, depending on specialty. Changing the definition of non-participation to less than 1000 CRVS units per quarter increased this proportion to 57%. Participation in Medicare was much more widespread, with only 9.4% supplying less than 500 CRVS units per quarter. However, decomposing total Medicare output into assigned and non-assigned components revealed that each subprogram had fairly high non-participation rates, 28.8% and 31.8%, respectively. This implies that many physicians tend to treat either only Medicare assignment cases or only Medicare non-assignment cases.

Finally, cross-tabulations of Medicare and Medicaid outputs indicates that 18.9% of the sample physicians did not participate in either Medicare assignment or Medicaid. As predicted, far more physicians participated in Medicare but not Medicaid (34.8%) than did the reverse (3.5%). Again, however, approximately equal proportions of physicians participated in either Medicare assignment or Medicare non-assignment only (19.6% and 16.6%, respectively). We suspect that this is due to the geographic dispersion of physicians between high- and low-income neighborhoods. Physicians located in low-income areas may not see very many elderly patients who are either not eligible for Medicaid or represent good collection risks. The reverse might be true of physicians in high-income areas.

5. What was the magnitude of ESP's impact on billed charges and Medicare assignment and Medicaid quantities?

This section of the analysis posed the following question: What would actual charges, Medicaid supply, and Medicare assignment supply have been in the absence of ESP? Using the es-

timated price and supply equations and Medicare's formula for limiting reasonable charges during ESP, we simulated hypothetical price and supply levels for the participating physicians in the two programs. Comparing these predicted values to the actual prices and quantities provides a rough measure of the magnitude of ESP's impact.

In general, ESP appears to have had significant effects on prices and services supplied for all three specialties in each of the 3 years. Actual charges were estimated to have been from 12% to 8% lower than they *would have been without ESP*. The program's biggest impact was generally in the first year, 1972. The difference between simulated and observed prices gradually declined, with a substantial jump in the latter following the end of ESP.

Since ESP was successful in constraining billed charges, it follows that the quantities of services supplied to Medicare assignment and Medicaid patients were larger than would have been expected without ESP. Our simulations confirmed this. Medicaid output was between about 8% and 15% higher, depending on specialty and year. Medicare assignment output was significantly higher, by about 11% to 17%, for 1972 and 1973, when ESP was fully in effect. The next year was a transition period, however, since controls on private prices were lifted on April 30, 1974, while Medicare reasonables remained unchanged until June 30. Medicare assigned output was still simulated to be greater than without ESP, but by only 2% to 3%. Finally, in 1975 the program had essentially no impact, since private charges were unconstrained while the Medicare reasonables were based on fees charged in calendar year 1973, which was covered by ESP. In general, these patterns are highly consistent with our basic behavioral conclusion—the quantities of services supplied are sensitive to the relationship between what physicians charge and what Medicare and Medicaid are willing to pay.

Physician Participation in Medicaid

Although many factors are likely to influence physicians' decisions to participate in the Medicaid program, this study's focus was on the role of financial incentives, specifically Medicaid reimbursement levels and revenues physicians could receive by treating other patients (see Hadley, 1979). Since Medicaid generally pays physicians some fraction of what they normally receive for any par-

ticular service, the program's structure creates an incentive to prefer full-paying patients over Medicaid patients. However, Medicaid's fees very likely exceed what physicians would generally expect to receive from poor patients in the absence of the program. Under some conditions, therefore, physicians may be very willing to treat Medicaid patients. This study's objectives, then, were to identify whether physicians' Medicaid participation decisions are in fact responsive to variations in Medicaid and private revenues, and second, to measure the potential effects of changes in financial incentives.

Unlike the phase of the research just reported, the unit of observation for this analysis was the county rather than the individual physician. Claims data for 3124 California general practitioners, internists, and general surgeons were aggregated by specialty and county for each of 4 years, 1972 through 1975. Various secondary county data were linked with the data constructed from the claims records to form the final analysis file. After combining sparsely populated rural counties into four groups, there were 30 cross-sectional observations for each specialty and year.

The Medicaid supply decision was divided into two components. The first is meaningful participation in the program at all. Many physicians may treat a small number of Medicaid-eligible patients out of purely charitable considerations or under bona fide medical emergencies, rather than in response to the Medicaid program's structure. Since it is the latter that is of primary interest, participation was defined as treating 10 or more Medicaid patients in a calendar quarter. The corresponding dependent variable was the percent of study physicians participating in Medicaid in each county.

The second Medicaid supply component was the average number of Medicaid patients per participating physician. Since the definition of participation depends on designating some essentially arbitrary number of patients, small fluctuations in Medicaid case loads around this threshold could cause wide fluctuations in observed participation rates. This, in turn, might convey highly misleading information about the actual quantities of services provided. By analyzing both the participation rate and average Medicaid case load, it is possible to generate a much more complete picture of physicians' responses to financial incentives.

Medicaid and private average revenues per patient were constructed as follows. All Medicaid patients treated by sample

physicians were grouped by physician specialty, and county size (large urban, small urban, and rural). A hypothetical average patient was constructed by computing the number or CRVS units of each of four basic types of services (medicine, surgery, radiology, and pathology) provided per Medicaid patient. These quantities were then multiplied by individual physicians' Medicaid reasonable and private fees.⁸ The resultant variables may thus be interpreted as the expected revenue from treating an average Medicaid patient. Other variables in the two equations included average physician experience, percent foreign medical graduates, average employees' salary in physicians' offices, county population, the number of physicians per Medicaid eligible, and a proxy measure of area-wide malpractice insurance premiums.

In general, the results strongly support the hypothesis that physicians' Medicaid supply decisions are influenced by the relative levels of Medicaid and private-pay patient reimbursements. As predicted by the theoretical model, both the participation rate and the number of Medicaid patients per participating physician are positively related to the expected average revenue per Medicaid patient and negatively related to the expected revenue from treating a comparable patient on a private basis. An increase of 10% in the average revenue per Medicaid patient, from \$30.54 to \$33.59, would increase the average participation rate by about the same percentage, or from 0.42 to 0.47. The impact on the number of Medicaid patients per participating physician appears to be smaller, with only about a 3% increase, from approximately 51 to 53 Medicaid patients on average. (The smaller impact on patient load is consistent with the low coefficient values for the Medicaid reasonable fee in the Medicaid supply function estimates reported above).

A similar increase of 10% in expected private revenue per patient, however, would have larger than offsetting effects on both the participation rate and average Medicaid case load. For the former, the net result would be a reduction of about 3 percentage points to an average participation rate of 0.39. The impact on

⁸Because Medicaid reasonable charges for each physician were constructed using 1968 calendar year actual charge data, there is considerable variation among physicians in Medicaid fees despite the fact that these fees are well below private or Medicare charges in later years. Thus, there is substantial cross-county variation in both the Medicaid and private, average revenue variables.

Medicaid patient loads is even larger, with a net reduction of about 5 Medicaid patients per physician. In part, these unequal effects may be due to the fact that the average revenue from treating a Medicaid patient at private fee levels is almost 30% greater than what Medicaid actually pays.

Conclusions

Two of the fundamental objectives of any physician reimbursement system are: 1) ensuring the availability of services to the poor and the elderly; and 2) keeping rates of fee and expenditure increase at or below acceptable levels. Accordingly, our overall goal has been to provide evidence that can be used in designing a physician reimbursement system that deals with these potentially conflicting objectives in a satisfactory way. We treated California physicians' experiences under Medicare, Medicaid, and the ESP as a natural experiment of how potential reimbursement systems structured like these programs might affect the variables of prime interest. While limiting our study to office-based solo practitioners in a single state makes generalization of the quantitative results risky, this approach does control for a number of potentially confounding influences. Thus, this section focuses on behavioral rather than quantitative generalizations pertinent to the basic concerns of containing costs while assuring service availability.

Looking first at physicians' fees, we can make three inferences. First, a system like Medicare or Medicaid, which establishes a price floor (i.e., the program reasonable charge), clearly leads to an increase in average actual charges. In effect, physicians who participate in the program are able to divide their potential patient population into those who are willing and able to pay the physician's total actual charge and those for whom the financing program pays the reasonable charge. Under such a situation, the actual charge is higher than it would have been in the absence of fixed fee programs like Medicare assignment and Medicaid.

Second, increases in program reasonable charges appear to have positive spillover effects on physicians' actual charges. Thus, either occasional or automatic increases in the fees paid by the financing programs will have an inflationary impact on the charges

of physicians who participate in the program. In general, the amount of any reasonable charge increase that is passed through will depend on the nature of the patient demand faced by the individual physician.

Third, a system that determines reasonable charges as a function of past actual charges has an additional inflationary bias, in the sense that physicians will set actual charges at a higher level in the current period in order to attain desired reasonable charge levels in the next period. This suggests that efforts to restrain reasonable charges which preserve the relationship between current charges and future reasonable charges may be offset by changes in physicians' billing behavior. Thus, for example, redefining Medicare's prevailing charge as, say, the 50th rather than the 75th percentile of the customary charge distribution, may produce a one-time decrease in Medicare reasonable fees, but ultimately result in a higher rate of fee inflation as physicians respond to the lower reasonable fees.

Fourth, our analysis of the ESP suggests that it did succeed in lowering both the absolute levels of billed charges as well as their rates of increase. At the same time, we found considerable evidence that constraining physicians' fees is not equivalent to containing either expenditures for physicians' services or physicians' net incomes.

Finally, analysis of physicians' supplies of services to Medicare assignment and Medicaid patients revealed that output allocation decisions are clearly sensitive to the prices physicians receive and that the two fixed-fee programs compete with privately insured and/or self-paying patients for physicians' services. Furthermore, it appears that physicians are more sensitive to changes in their actual charges than in program reasonable charges.

As a direct consequence of this last conclusion, stimulation of ESP's impact on the supplies of services suggested that, when all fees were constrained, physicians responded by increasing the quantities of care provided to the two public programs. This occurred because the simulation implied that ESP had a relatively larger impact on actual charges than on program reasonable charges, so that the gap between actual charges and reasonable charges was smaller than it would have been in the absence of ESP regulations.

A similar conclusion regarding the importance of both reasonable and actual charges was generated by a second policy simulation that investigated what might happen if Medicare and

Medicaid reasonable charges were increased to the point where they equalled the actual charge, i.e., the differential between public and private fees were eliminated. Two cases were examined: one holding actual charges fixed and the other permitting them to increase. In both cases, we found that raising the program reasonable charges induces physicians to increase their quantities supplied to program beneficiaries. In the second case, however, the increase in actual charges results in subsequent decreases in the quantities of Medicare assignment and Medicaid services. Program costs are smaller in the second case, because of the lower Medicare assignment and Medicaid output levels. Because physicians receive a higher reasonable charge for all Medicare assignment and Medicaid claims, however, the difference in program costs between the two cases is much smaller than the difference in quantities supplied. Further, the higher billed charges contribute to increased inflation and expenditures in the private sector. The net effect for Medicare assignment patients is higher coinsurance rates and fewer services.

These two simulations and their underlying price and supply functions clearly underline the interdependencies between public program reasonable charges and outputs, and actual charges. Thus, policies that attempt to modify the existing Medicare and Medicaid reimbursement methods will very likely have spillover effects onto actual charges, which in turn affect physicians' decisions to supply services to publicly supported patients.

These conclusions raise other questions that, unfortunately, cannot be addressed with the data available to this study, such as: Do the suggested increases in services to the Medicare assignment and Medicaid programs represent a substitution of public for private patients, a shift in the locus of care for public patients, a reduction in the relative proportion of non-assigned claims, the satisfaction of public patients' unmet medical care needs, or the creation of demand by physicians? Can anything be said about demand creation in the private market? There is also the further complication of evaluating how beneficial the additional services might be to Medicare assignment and Medicaid patients. Even though the primary goal of these programs is to increase the supplies of services to elderly and poor patients, policy makers cannot be indifferent to the mix and quality of those services.

In the absence of data on both physicians' total practice activities and patients' utilization patterns, these questions are most

difficult to answer. Questions of demand creation, quality, and necessity are best addressed by investigating individual procedures and patient diagnoses. However, the conclusion that physicians will expand the supplies of services to public programs when private fees are constrained is not inconsistent with the possibility that services will be increased in the private market as well.

Implications for Policy

What are the implications of our conclusions for the design of a physician reimbursement system that would 1) increase access for publicly supported patients, and 2) control costs? First, the customary-prevailing reasonable (CPR) method used to determine payments to individual physicians by Medicare and many Medicaid and private insurance programs should be eliminated. The CPR method preserves large differences in payments to physicians in the same medical specialty and geographic area for performing the same procedure, and thus perpetuates inequities among physicians. It has an inherent inflationary incentive, because the reasonable charge levels of next year's program are based on this year's actual charges. Moreover, CPR does nothing to increase physicians' willingness to treat poor or elderly patients. It has no effect on, and in fact maintains, the gap between what physicians are paid for treating Medicare assignment or Medicaid patients and what they receive from privately insured and self-paying patients.

Second, a policy should be adopted like Medicare's Economic Index, which limits increases in Medicare prevailing fees to a value determined by national rates of growth in physicians' costs and incomes. The Economic Index eliminates at least two of the problems associated with CPR fee-determination methods: 1) it largely severs the link between current actual charges and future reasonable charges, thus removing one source of inflationary pressure; and 2) it effectively eliminates disparities among physicians in what Medicare will pay for an identical procedure. If physicians' customary and actual charges increase at rates that exceed the limits imposed by the Economic Index, then the area's prevailing fee for each procedure will eventually become the reasonable charge for all physicians in the area.

These two improvements in the reimbursement system are likely to come at the cost of a reduced willingness to treat Medicare assignment and Medicaid patients. Since the Economic Index constrains Medicare reasonable charges to grow at a rate generally below the rate of increase in actual charges, the gap between public and private fees must inevitably widen. Our analyses strongly suggest that this would have an adverse effect on the quantities of care supplied to Medicare assignment and Medicaid patients. (Medicaid is also affected, since the Medicaid program is prohibited from paying more than Medicare for any given service.) Furthermore, the Economic Index still allows automatic annual increases in reasonable charges, albeit smaller than what would occur under a CPR system. Since these increases amount to raising the price floor faced by physicians, they will add to inflationary pressures on actual charges.

These observations lead to two additional implications for policy. Fees should be uniform for all patients and should not be allowed to increase solely at provider discretion. A reimbursement system that perpetuates a fee differential between public and private patients clearly invites discrimination in favor of the higher fee patient. Like anyone else, physicians prefer to be paid more rather than less for an identical service. Thus, if public policy truly desires to provide equal access to office-based physicians' services, it seems that equal fees for all patients would be called for. Our analysis of physician pricing, however, suggests that periodic attempts to eliminate the differential in fees by raising public payments will lead to higher physicians' charges and expenditures in what might be an ever-unsuccessful game of catch-up. Both of these observations inevitably lead to the recommendation that either structural changes or additional policy instruments are needed. Maintaining the availability of services to the poor and the elderly calls for equalizing fees. Limiting fee inflation and/or total expenditures requires separate controls on either all fees, or on physicians' gross or net incomes. The most obvious mechanism for limiting fee inflation is the use of a uniform fee schedule that cannot be increased without agreement of some public authority. Such a fee schedule may vary among specialties and locations, but should treat all patients uniformly.

Our results also suggest that simply limiting average fee growth by itself may not effectively limit undesirable growth in expenditures on physicians' services, at least over a short time period. In com-

paring the price control and non-control years, we found major differences in the quantities of several types of services (such as office visits for established patients, electrocardiograms, injections, radiology procedures, and pathology procedures) which many believe can be manipulated by physicians for revenue-generating purposes.

This does not imply that fee controls should not be a basic element in a national cost-containment strategy. Fee controls that are permanent may be considerably more effective than those employed during the ESP. In the relatively short term, many inputs of a physician's practice, particularly a solo practitioner's, are fixed. If some of these inputs are not fully utilized, moderate expansions of outputs can be achieved in the short term at very low marginal cost. The principal increase in cost would be in physician's own time, and this also may be negligible if time spent per visit is reduced. The result is that the revenue at the margin from even controlled fees may considerably exceed the added costs of expanding the number of visits and diagnostic tests.

Larger or prolonged increases in output might require major changes in the number of employees, wage structure, hours of employment, space, facilities and the administrative input of the physician. If controls on rates of increase are regarded as permanent, physicians may accept some reductions in money incomes, perhaps even in real incomes, in exchange for a smaller patient load and greater leisure. In addition, it is unlikely that patients will submit to increasing numbers of follow-up visits, diagnostic tests, and surgical procedures year after year. If fees were controlled for several years, it is doubtful that physicians could continue to maintain incomes through demand expansion (see Hadley, Holahan, and Scanlon, 1978).

Although the long-term consequences of fee controls may be considerably different from the short-term ones, it does not seem wise to base policy on such speculations. The fourth implication of our research, therefore, is that additional policy instruments should be adopted to influence the quantity, mix, and quality of services provided. Although determining the nature of such instruments is beyond the scope of this project, the following factors deserve careful consideration.

First, fee schedules should be structured so that fees reflect the costs of producing services in a technically and economically ef-

ficient manner. Although determining the costs of producing individual physicians' services is extremely difficult, it is probably possible to achieve a much closer relationship between fees and marginal costs than now exists. Successful efforts in this direction would reduce physicians' incentives to influence patient utilization decisions.

Second, utilization review, if appropriately applied, may help limit demand expansion in response to controls. Because of the large number of inexpensive discrete services, the costs of monitoring utilization patterns in ambulatory settings are likely to be high relative to the savings from claims denials or services deterred. Thus, a utilization review system is likely to be cost effective only if it is 1) applied on a post-treatment review basis with monitoring of a carefully selected group of procedures and ratios to ferret out the most obvious abusers; and 2) sufficiently visible and stringent to serve as a deterrent to all others.

A third possible strategy would be to link annual fee increases to average rate of growth in physicians' net incomes. If incomes increase at a greater than anticipated rate, then fee increases are reduced according to an agreed upon formula. Systems of this type are currently in operation in West Germany and Quebec, Canada (Glaser, 1976). Their experiences should be carefully analyzed.

Finally, a basic element of any system of control on physicians' fees and volume of services is a substantial and continuous data-gathering and analysis program. Our study demonstrates very clearly that price indexes are highly sensitive to the number of procedures used in constructing them. Price indexes using base year service weights are subject to major errors because physicians make substantial changes over time in the services they perform. Procedures also vary significantly in their relative importance within a specialty. Construction of price indexes using current year services must face the problem of isolating the price change associated with the shift in service mix from any change in the quantity of service being provided. Likewise, no one set of procedures is useful for developing indexes for more than one specialty. The problem is particularly serious with surgery, laboratory, and radiology procedures, since physicians provide small quantities of a large number of procedures. For the same reasons, it is critical that a large number of different procedures be used to analyze shifts in the volume of surgery, radiology, and pathology services. For example, we found in

the course of the present study that analysis of 200 procedures was not adequate to accurately determine changes in surgery, pathology, and radiology services. As a result, we used the entire universe of procedures.

The discussion above describes the basic elements of an ideal physician-reimbursement system. We recognize that such a system could have redistributive consequences that are unacceptable to many. Such a program could have adverse effects on the amount and quality of care available to those not currently covered by public programs. Identifying these effects, which should be an important part of the policy debate, requires further research.

We also recognize that there are severe problems facing any effort to implement such a system. For example, a reimbursement system with fees that are uniform across patients requires an agreement with physicians that prohibits additional charges to any patient. Physicians would have to be given strong incentives to accept such an agreement. As noted earlier, determining the relative costs of medical procedures is a difficult task, as is developing a cost-effective utilization-review system. Constructing a fee schedule with annual increases tied to desired changes in incomes requires that relevant data be made readily available to government and provider negotiators. This may be very difficult to accomplish, particularly in a system where many carriers are permitted to operate.

In general, changes of this magnitude may be possible only as part of a national health insurance system with unified billing procedures within bargaining areas. Although there are serious obstacles to reform of our current arrangement for paying physicians, continuation of present policies is also fraught with difficulties. Thus there is a clear need for serious public policy debate in this area.

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