

Medicaid Mills: Fact or Fiction

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Physician nonparticipation in Medicaid programs not only will restrict access of the poor to mainstream medicine but will also encourage the development of large Medicaid practices (LMPs). Policymakers have become increasingly concerned that these settings may be "Medicaid mills" in which low quality care is provided. Using HCFA survey data, this study examined the characteristics of LMPs, defined as practices in which at least 30 percent of the patients are eligible for Medicaid. Nearly 60 percent of all Medicaid patients treated in private practices are seen in these LMPs (14.5 percent of all practices).

Most LMPs do not appear to be Medicaid mills. LMP physicians earn what other physicians make at best; often they earn less. Nor is there any widespread abuse of ancillary services, skimping on auxiliary staff, or excessive markups over costs, all characteristic of Medicaid mills. Visit lengths are shorter in LMPs, but only by a minute or two. A substantial "credentials gap" does exist, however; the Medicaid market is dominated by less qualified physicians. LMP physicians tend to be older, non-board certified, and graduates of foreign medical schools.

Recent investigations by Senator Frank Moss have spotlighted fraud and abuse in large Medicaid practices. The Moss committee report provides a colorful, distressing portrait of Medicaid mills (U.S. Senate Special Committee on Aging, 1976). While fraudulent behavior and low quality care certainly were characteristic of these facilities, findings are limited to the handful of practices actually visited. In particular, we have no way of determining whether such behavior is characteristic of large Medicaid practices (LMPs) generally. A high percentage distribution of Medicaid patients cannot be considered *prima facie* evidence of a mill, a point we return to in detail later in this paper.

Poor quality of care in large Medicaid practices is allegedly a function of a lack of physician credentials, a high caseload, and excessive use of ancillary services, such as laboratory services and X-rays. The Moss report and a 1970 Senate Finance Committee report provide some evidence of ancillary overprescription. LMP physicians are generally believed to have less specialized training or less adequate training than other physicians. In particular, they have been described as disproportionately older (Kavaler, 1969), general practitioners (Sloan, Cromwell, and Mitchell, 1978; Jones and Hamburger, 1976), foreign medical

graduates (Studnicki *et al.*, 1976; Sloan, Cromwell, and Mitchell, 1978), and lacking hospital affiliations (Kavaler, 1969; Bloom, 1968). Finally, LMP physician caseloads have been described as exceedingly high, seriously limiting the amount of time the physician spends with any one patient (Bloom, 1968).

These descriptive studies suggest that large Medicaid practices are run by poorly trained but wealthy physicians who spend inadequate time with patients and overprescribe tests and procedures. Based on these studies, we cannot determine whether such behavior is characteristic of all large Medicaid practices, or whether it is limited to only a few true "Medicaid mills." Only one study used a national sample, but it did not examine the question of large Medicaid practices directly (Sloan, Cromwell, and Mitchell, 1978). The remaining studies were based on a few, selected practices, usually in the same two cities, Chicago and New York. Perhaps most important, these studies generally had no other physician practices for comparison purposes. It is thus almost impossible to determine how many laboratory tests and injections are too many, whether office visits are too short, or whether practice loads are excessively high. The survey data presented in this paper enable us to compare large Medicaid practices with other physician

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practices on a national basis for the first time. In particular, this paper sought to answer the question: Are large Medicaid practices "Medicaid mills?"

Data Sources

The primary data base for this analysis is the 1976 physician survey conducted by the National Opinion Research Center (NORC) for the Health Care Financing Administration (HCFA).¹ This survey was a nationally representative sample of 3,842 physicians in 15 specialties. All physicians were in private practice, and the vast majority (95.8 percent) were office-based. Group practices with 10 or more physicians were excluded from the sampling frame.²

An extensive questionnaire was administered to all physicians by telephone. This questionnaire yielded data on practice costs, work effort, size and type of practice, physician income, and fees. All information was based on physicians' reports.

Measurement error may be present if physicians refused to participate in the survey or if their information was inaccurate or incomplete. Given the negative publicity surrounding large Medicaid practices, physicians with such practices might be reluctant participants. It is unlikely, however, that any significant nonresponse bias has been introduced, for several reasons. First, the explicit objective of the survey was not to investigate such practices, and in fact included only a single question on the extent of Medicaid participation. Second, analysis of the NORC-HCFA survey from the preceding year had found that physicians who did not respond did not differ from cooperating physicians in characteristics believed to be associated with large Medicaid practices, such as specialty, board-certification, and foreign medical graduate (FMG) status (Sloan, Cromwell, and Mitchell, 1978). Finally, statistical weights associated with the 1976 sample include adjustments for nonresponse.

Another source of potential error is the extent of under- or over-reporting by physicians who did take part in the survey. Two areas of particular concern are physician net incomes and work effort. Questionnaire data on physician net incomes and hours of work were used to assess the accuracy of survey responses (American Medical Association, 1979). Specialty-specific means from the two sources were quite comparable. Non-participation and non-response among physicians operating true Medicaid mills is still likely, even given the validation procedures. How serious a bias this creates is unknown.

Three additional data sources were merged with the physician survey for this analysis. Biographical information on individual survey physicians, including such

data as physician age, board certification, and medical school, was obtained from the *AMA Masterfile*. Demographic characteristics were obtained from the Area Resource File. Two community variables, *per capita* income and physician-population ratios, were obtained from a more up-to-date source: the *AMA's Physician Distribution and Medical Licensure in the U.S., 1976*.

Overview of Large Medicaid Practices

Medicaid participation rates were calculated from the individual physician's response to the following question: "About what percentage of your patients have Medicaid?" This percentage was assumed to accurately reflect the share of physician work effort devoted to Medicaid patients.³ The size distribution of Medicaid practices is shown in Figure 1. The numbers at the top of each bar represent the percent of total physicians in the Medicaid practice size class. The numbers along the X-axis represent the percent of practice patients who receive Medicaid. The histogram displays a marked right skew; almost one-fourth of the sample (23 percent) do not treat Medicaid patients. Most participating physicians have fairly small Medicaid practices. For purposes of this analysis, LMPs are defined as those practices in which 30 percent or more of the physician's patients receive Medicaid. Thirty percent is a full standard deviation above the mean percentage of Medicaid patients in a practice (12.7 percent). Approximately 14 percent of sample physicians fall into this "outlier" category. It is plausible, however, that practices with an even higher concentration of Medicaid patients may share more of the characteristics associated with a mill. In order to test this, physicians with "extra-large" Medicaid practices (EXLMPs), those with at least one half of their practice devoted to Medicaid patients, are also compared.

The histogram in Figure 1 clearly demonstrates the unequal size distribution of Medicaid practices, but what is the distribution of Medicaid *patients* across these practices? It is possible that physicians in large Medicaid practices treat only a relatively small proportion of the total Medicaid population. If so, policymakers might be less concerned about the possibility that these large Medicaid practices are mills.

Using Medicaid mix and caseload data, a Lorenz curve was constructed measuring inequalities in the distribution of Medicaid patients across physicians (Figure 2). The cumulative percentage of Medicaid patients in physicians' practices (calculated in 20 percent increments) is plotted along the Y-axis, and the cumulative percentage of physicians along the X-axis. (For comparison purposes, Lorenz curves for Medicare and Blue Shield patients are also presented.) If

¹Data collection actually took place in 1977; cost and income data refer to the previous calendar year, hence its designation as a 1976 survey. All other data, such as fees and visits, refer to the actual year in which they were obtained (1977).

²Practices of this size include only six percent of all physicians nationwide (AMA, 1979). The practices exposed in the Moss committee report would not necessarily have been excluded by this particular sampling criterion. Those mills were staffed by a range of health care providers, only a few of whom were actually physicians.

³Data on the actual *number* of visits rendered to Medicaid patients are not available from the 1976 survey. In order to assess the extent of bias (if any), two alternative specifications of Medicaid participation were compared using the 1975 HCFA-NORC sample: 1) proportion of patients who receive Medicaid and 2) proportion of total visits provided to Medicaid patients. A t-test of means showed no significant differences, supporting our use of "patients treated" as an unbiased estimate of Medicaid practice size.

FIGURE 1
Medicaid Participation Rate for All
Physicians

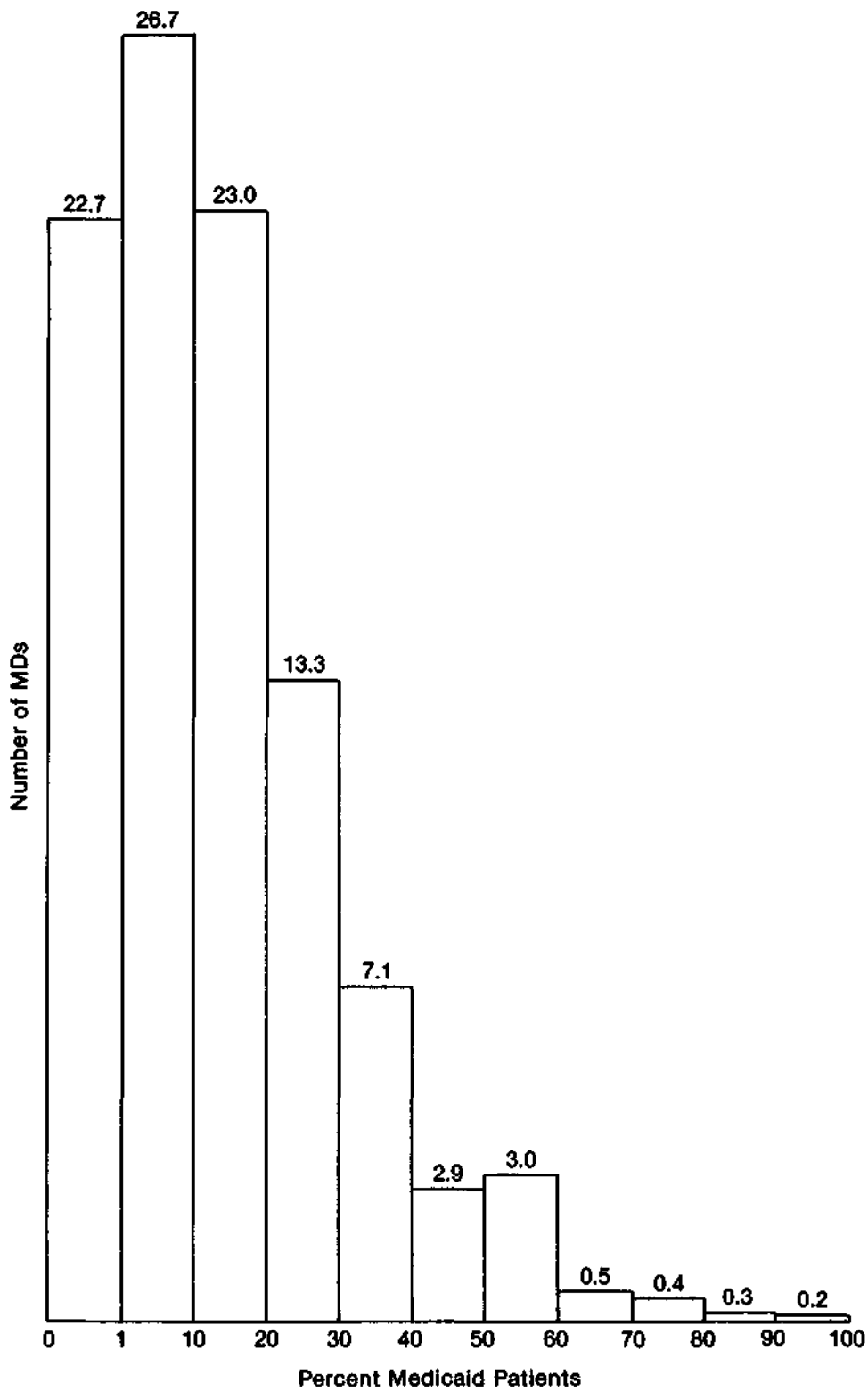
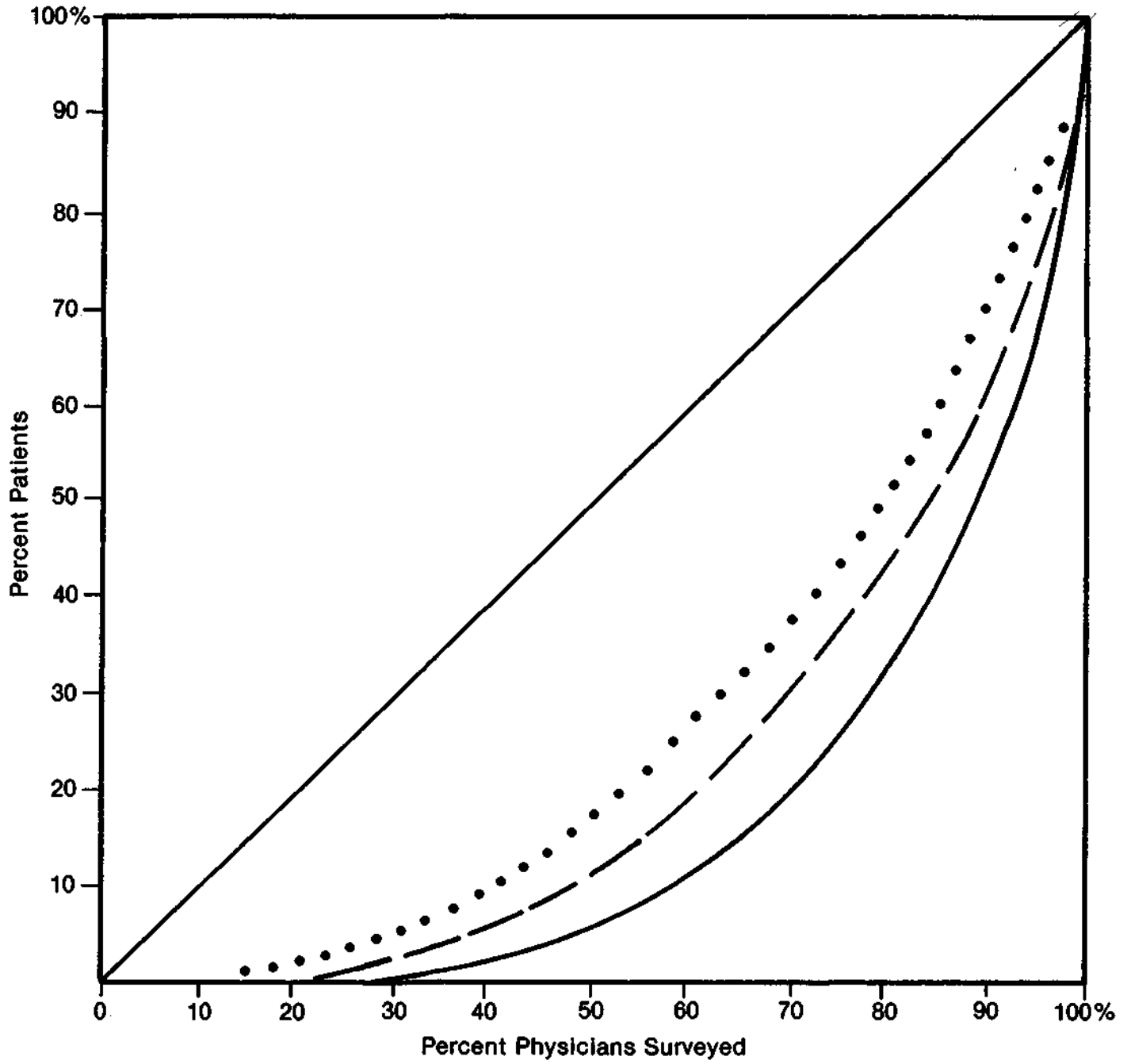


FIGURE 2
Lorenz Curve



— Medicaid
- - - Medicare
..... Blue Shield

Medicaid patients were perfectly distributed across practices, all would be small Medicaid practices (SMPs), and the Lorenz curve would coincide with the straight diagonal line. In fact, the observed distribution indicates considerable unevenness in the distribution of Medicaid patients. Three-quarters of sample physicians care for only 26 percent of the total Medicaid population. Almost one-third (31.8 percent) of all Medicaid patients, on the other hand, are treated by 5.5 percent of the physicians. A small number of physicians appear to have assumed responsibility for a large proportion of the nation's poor.

The Gini Index of Concentration provides a summary statistic of the extent of inequality shown by the Lorenz curve and is calculated as the ratio of the area between the diagonal and curved line to that of the total triangle. It ranges from zero to one, with zero representing complete equality (that is, the curved line lies on the diagonal) and one perfect inequality. The Gini coefficient for Medicaid patients is 0.6520, indicating considerable maldistribution. By contrast, the Gini coefficient for physician distribution is 0.1558 (Morrow, 1977), indicating that physicians are much more evenly distributed across the population generally than are Medicaid patients across physicians. For reference, we note that the distribution of both Blue Shield and Medicare is more even than Medicaid, although significant inequalities still remain. The Gini coefficients for Blue Shield and Medicare patients are 0.4649 and 0.5419, respectively.

The Lorenz curve suggests that LMP physicians not only devote a large proportion of their practice to

Medicaid, but that they also see the majority of all Medicaid patients treated in private practices. The EXLMPs alone see 31.8 percent of all Medicaid recipients, and together with other LMP physicians, they provide care to over one-half of this Medicaid pool (58.4 percent). Analysis of these LMPs is certainly warranted for policy purposes. If even a minority of them are in fact Medicaid mills, the quality of care will be diminished for a very large number of public patients.

Before analyzing the large Medicaid practices in detail, we will briefly compare the size distribution of Medicaid practices across the specialty groups. Medicaid participation rates for primary care physicians have previously been reported by Sloan, Cromwell, and Mitchell (1978). This is the first time, however, that national estimates have been available for the other specialties as well. As seen in Table 1, participation levels vary considerably by specialty, ranging from 6.1 percent for allergists to 16.2 percent for otolaryngologists, around an average of 12.7 percent.

With the notable exception of obstetrician-gynecologists (OB-GYNs), primary care practitioners are more likely to have large Medicaid practices than are the specialists. In part, this may reflect the role of primary care physicians as "gatekeepers" for the rest of the health care system. In addition, usual fees for primary care practitioners may be closer to the Medicaid allowed fee than those of specialists, encouraging them to see a large number of Medicaid patients.

TABLE 1
Size Distribution of Medicaid Practices by Specialty

Specialty	Medicaid Practice Size			Average Medicaid Participation Rate
	None	Small (under 30%)	Large (over 30%)	
Primary Care	21.6%	62.6%	15.8%	13.3%
General Practice	24.3	60.8	14.9	13.5
General Surgery	8.4	75.1	16.5	14.3
Internal Medicine	18.1	62.5	19.4	14.5
Obstetrics/Gynecology	36.8	53.3	9.9	8.3
Pediatrics	24.1	58.5	17.4	14.3
Medical Specialties	32.2	58.8	9.1	9.0
Allergy	40.0	55.3	4.7	6.1
Cardiology	39.2	55.7	5.1	6.7
Dermatology	26.1	56.5	17.4	13.1
Gastroenterology	15.2	77.9	6.9	10.0
Surgical Specialties	15.3	71.7	13.6	13.3
Neurosurgery	18.3	71.6	10.1	10.9
Ophthalmology	12.4	72.7	14.9	14.4
Orthopedic Surgery	19.8	71.2	9.0	10.7
Otolaryngology	13.2	66.5	20.3	16.2
Urology	14.1	69.2	16.6	14.3
Psychiatry	39.9	51.7	8.4	8.0
ALL	22.6	62.9	14.5	12.7

Both medical and surgical specialists have undergone additional years of professional training and can (and do) command high fees for their services. Human capital theory would hypothesize that all specialists, regardless of specialty type, would find Medicaid fee schedules relatively less attractive and hence be less likely to participate. In spite of this, the two groups differ markedly in their mean levels of Medicaid participation. Medical specialists are twice as likely as their surgical colleagues not to participate in Medicaid (32.2 percent vs. 15.3 percent), and likewise have far fewer LMPs. Surgical specialists, on the other hand, more closely resemble primary care practitioners in their average willingness to treat Medicaid patients.

The descriptive and multivariate analyses of large Medicaid practices that follow are limited to the five major specialties: general/family practice, general surgery, internal medicine, OB-GYN, and pediatrics (with an unweighted sample size of 1,796). These specialties constitute over one-half of office-based patient care physicians nationwide. Primary care physicians also provide access to ambulatory medical care, an area of great concern to Federal policy makers. Finally, it is these physicians who have been most frequently identified as running Medicaid mills.

Comparisons and statistical tests of LMPs may vary as a function of the physician group used as a reference point. By the very fact of their nonparticipation, physicians with no Medicaid patients are a unique group; they are a small group relative to SMP physicians and they tend to be older and politically more conservative (Sloan, Cromwell, and Mitchell, 1978). Physicians with SMPs, on the other hand, can be considered a modal form of medical practice and one that policymakers want to encourage. In both descriptive and multivariate analyses, LMP physicians (and those with extra-large Medicaid practices) will be contrasted with SMP physicians.

Descriptive Analysis of Large Medicaid Practices

PRACTICE LOCATION

Large Medicaid practices are often considered an urban phenomenon, located primarily in the ghettos of our largest cities. This image, however, does not square with the facts. Table 2 displays the size of Medicaid practice by geographic location: large (greater than 1.4 million), small, and non-metropolitan area, high (greater than 7 percent) and low Medicaid population as a share of total county population, and

TABLE 2
Geographic Location by Size of Medicaid Practice¹
(percentage distributions)

Location	Medicaid Practice Size			
	None	Small	Large	Extra-Large
Large Metropolitan:	49.0/25.9	37.8/59.4	39.3/10.7	32.2/4.0
High Medicaid	10.1/32.3	5.1/48.1	5.6/ 9.0	13.9/10.6
Low Medicaid	38.9/24.6	32.7/61.7	33.7/11.0	18.3/ 2.7
Small Metropolitan:	36.0/19.9	38.1/62.8	38.5/11.0	48.7/6.4
High Medicaid	1.6/ 7.3	5.3/70.2	4.8/10.8	11.3/11.7
Low Medicaid	34.4/21.6	32.8/61.7	33.7/11.0	37.4/ 5.6
Non-Metropolitan:	15.2/14.9	24.0/69.8	22.1/11.0	19.1/ 4.3
High Medicaid	1.6/ 8.5	4.2/62.4	8.8/22.5	6.1/ 6.7
Low Medicaid	13.6/16.4	19.8/71.6	13.3/ 8.2	13.0/ 3.8
Region:				
North East	27.7/21.4	29.3/65.5	9.2/ 3.6	54.0/ 9.6
North Central	21.2/21.5	23.3/68.3	16.4/ 8.3	8.2/ 1.9
South	38.2/27.7	27.5/57.7	31.4/11.7	19.7/ 3.3
West	12.8/13.4	19.9/59.9	42.9/22.3	18.2/ 4.3

¹Percentages to the left of the slash (/) sum to 100% within each column. Percentages to the right sum by row.

region of the country.⁴ Both SMPs and LMPs exhibit the *same* distribution across large and small metropolitan areas, while EXLMPs are actually more prevalent in small metropolitan areas. EXLMPs, therefore, are more likely than SMPs to be in small cities, which is certainly unexpected. Nearly one out of every five LMPs and EXLMPs, furthermore, is located in a non-metropolitan or rural area. Most LMPs are not located in the large industrial cities in the North, but rather in the South and West. The EXLMPs, however, are primarily located in the Northeast, as expected.

PHYSICIAN INCOMES

One of the biggest concerns of policymakers is the incomes enjoyed by physicians in LMPs. The presumption is that many are making extraordinary incomes, taking advantage of a fully insured, but medically unsophisticated, population. After adjusting for specialty and geographic cost-of-living differences, however, there is little evidence to support these claims; no salient pattern exists as Medicaid participation increases. There are no significant differences in mean net incomes between SMP and LMP physicians. General practitioners, general surgeons, and internists with EXLMPs actually earn significantly less; the average EXLMP general practitioner earns \$44,447, compared with \$56,841 for his SMP colleague. OB-GYNs and pediatricians have net incomes comparable to their SMP peers. A small number of LMP physicians do earn unusually high incomes, which is surprising given the generally low Medicaid fee schedules. This group was identified for additional analyses, which are presented in a later section.

Adjusting income for work effort does not alter the overall conclusion that LMP and EXLMP physicians as a whole are not enjoying extraordinary returns. If anything, hourly earnings are *lower* in practices serving large numbers of Medicaid patients. This is particularly true of general practitioners in LMPs and EXLMPs whose earnings per hour are (respectively) four to seven dollars less than those in SMPs. Even though LMP and EXLMP physicians report incomes and earnings per hour no greater than in other practices (and often lower), one could still argue that these hourly earnings are unjustified given their background and training, a point addressed in the following section.

PHYSICIAN CREDENTIALS

Physicians who specialize in Medicaid patients have been characterized as having fewer credentials on average than other physicians. To the extent that these physicians have less or inadequate training, Medicaid recipients in their practices may be receiving lower quality care. LMP and EXLMP physicians do have fewer credentials on average than do SMP physicians, but these differences are not linear with respect

⁴The size distribution of Medicaid practices across geographic areas will vary as a function of private demand, physician supply, and the eligibility and reimbursement procedures of State Medicaid programs. For a detailed exposition of the economic theory of large Medicaid practices and econometric analysis, see Mitchell and Cromwell, 1979.

to size of Medicaid practice. General practitioners dominate the extra-large Medicaid practices; almost three-fifths of physicians in these practices (59.2 percent) are general practitioners, as compared with only 39.9 percent of the SMPs. By contrast, the LMPs include a significantly higher proportion of internists (30.5 percent) than do SMPs (20.9 percent). Both LMP and EXLMP physicians are significantly less likely to be board-certified (32.1 percent and 15.9 percent), compared with 42.8 percent for SMPs.

Twice as many FMGs are found in LMPs as in SMPs; one out of every five physicians with a large Medicaid practice was trained outside the U.S. Using a more restrictive definition of Third World FMGs⁵, LMPs include three times as many FMGs; 14.5 percent versus 4.8 percent. Surprisingly, the extra-large Medicaid practices do not include any more FMGs, however defined, than do the SMPs.

Some policymakers have expressed concern that large Medicaid practice physicians are older and that this may detract from the quality of care, not because these physicians are incompetent, but simply because they have not been trained in the newer medical technology. Similarly, physicians without hospital affiliations may provide less up-to-date care if they are unable to admit their patients to the hospital. Only EXLMP physicians appear to fit this characterization; they are significantly more likely to be 60 years of age or older (46.1 percent, compared with 28.8 percent of SMPs) and less likely to be affiliated with a hospital (5 percent vs. 1.5 percent).

Earlier, we introduced the possibility that LMP physicians may be enjoying incomes that, if not excessive compared to other physicians, were relatively high given their background and training. To test this hypothesis, adjusted hourly earnings of all primary care physicians were regressed on the list of physician credentials (including age) and other exogenous variables that might affect returns to labor.⁶ Residuals from this regression should reflect returns over-and-above those attributable either to the background and training of the physician or to location choice. Holding both credentials and economic factors constant, there is no evidence that the LMP or EXLMP physicians as a group earn extraordinary incomes. In fact, just the opposite is the case: physicians with Medicaid-dominated practices earn significantly less per hour worked than their peers who see a smaller number of Medicaid patients, all else being equal.

CASELOAD AND WORK EFFORT

Physician caseloads have been a major concern in large Medicaid practices for two reasons. First, relatively high volume in these practices suggests that many Medicaid visits may be of marginal benefit or even unnecessary. Any such induced demand by

⁵As some foreign medical schools are generally believed to have better curricula than others, we distinguish Third World FMGs from other FMGs. The Third World FMG is defined here as a graduate from a non-Western European, non-English speaking country. Graduates from Mexican schools are excluded as many are American citizens.

⁶This list was drawn from Sloan (1974). For a theoretical discussion of the hours worked equation, the reader is referred to his work.

physicians will clearly drive up Medicaid expenditures. Second, high LMP volume may be achieved through shorter physician contacts, thus lowering quality of care for Medicaid recipients.

Physicians in both LMPs and EXLMPs make significantly more visits *in toto* than do those in SMPs, approximately 10 percent more on average (Table 3). Allocation of total visits also varies across visit categories. Physicians in EXLMPs are less hospital based than those in SMPs, providing significantly fewer visits in inpatient settings and more in their offices. Both LMP and EXLMP physicians, however, allocate a significantly higher proportion of their caseload to emergency room and clinic visits. Absolute ER/clinic visits are also significantly higher in LMPs and EXLMPs, 14.4 and 14.5 visits per week, compared with 9.3 in SMPs. This is somewhat disturbing, as a major Medicaid policy objective is to discourage the utilization of institutional sources of ambulatory care.

LMP and EXLMP physicians clearly have higher caseloads; but for policy purposes this would not matter if they worked longer hours. As seen in Table 3, however, there are no differences in total hours by size of Medicaid practice. Are patients hurried through the physician's office on an assembly line basis? Table 3 suggests they are not. Physicians in large Medicaid practices do spend less time with office patients, but the differences are trivial; office visits are only two minutes shorter on average. Furthermore, the length of visit in extra-large Medicaid practices is no different than in SMPs.⁷

⁷Lengths of visit could systematically vary by patient class, that is, the LMP physician might spend less time with Medicaid patients than private patients but still achieve mean visit lengths comparable to those of SMPs. Of course, this becomes increasingly difficult as the Medicaid share of the practice grows. Regression analysis by Sloan and Lorant (1976), furthermore, has also found that the percent of practice Medicaid has no impact on length-of-visit.

GROSS REVENUES, COSTS AND MARKUPS

Besides the natural concern over the quality and continuity of care afforded Medicaid patients in LMPs, there is a general feeling, expressed in Congressional testimony and elsewhere, that significant numbers of LMP physicians are financially abusing the system. If this is the case, it is not reflected in physician net income as we have already shown. High markups and gross billings, however, remain a concern.

Table 4 presents gross revenues, costs, and net revenues (or markups) per visit for the five primary care specialties by extent of Medicaid participation. Both gross revenues per visit and markups fall as extent of Medicaid participation increases. Excluding high income LMPs, LMP markups are only 82 percent of SMP markups (\$9.12/\$11.19); EXLMP markups are only 58 percent as much (\$6.51/\$11.19). Including high income LMPs, the average LMP/SMP markup ratio is 86 percent. LMP markups as a whole are lower primarily because of lower gross revenues per visit, not lower costs. Average costs per visit in LMPs are 96 percent of costs in SMPs, but gross revenues per visit are only 90 percent. EXLMP gross revenues per visit are even lower (only 68 percent of SMPs). A breakdown by specialty shows essentially the same pattern of declining gross revenues and markups as Medicaid participation rises.

ANCILLARY SERVICES

The excessive use of ancillary services is an identifying characteristic of Medicaid mills. Although it is not possible to determine the medical necessity of the ancillaries provided in large Medicaid practices, we can compare the frequency with which they are ordered to SMPs. The HCFA survey asked each physician to estimate the percent of office visits for which

TABLE 3
Caseload, Visit Locus and Work Effort by Size of Medicaid Practice

Effort Per Week	Size of Medicaid Practice			
	None	Small (under 30%)	Large (30%-49%)	Extra Large (50% or more)
Total Visits	157.1	169.3	188.1 ³	185.9 ³
Percentage ¹ :				
Office	70.8%	61.6%	60.6%	69.3% ²
Inpatient	21.8	28.6	25.5 ⁴	19.7 ²
Operations	1.8	2.2	2.7	1.0 ²
Emergency Room/Clinic	2.6	5.2	7.1 ³	7.7 ³
Nursing Home	1.4	1.6	3.0 ⁴	1.6
House Calls	1.6	0.7	0.5	0.7
Total Patient Care Hours	47.2	51.5	52.6	51.3
Length of Office Visit (minutes)	22.0	19.6	17.8 ³	19.7

¹May not sum to 100%, due to rounding.

²Significant from SMP mean at 1% confidence level

³Significant from SMP mean at 5% confidence level

⁴Significant from SMP mean at 10% confidence level

he or she ordered four types of services: laboratory tests, injections or immunizations, X-rays, and office surgery.

Evidence that large and extra-large Medicaid practices order excessive ancillaries is ambiguous at best. Higher utilization rates by one specialty are often offset by lower rates for another specialty. General surgeons and OB-GYNs with large Medicaid practices order significantly more tests, but internists and pediatricians prescribe significantly fewer. EXLMP physicians, furthermore, use laboratory services at the same rate as their colleagues in small Medicaid practices. Injections, however, appear to be used at exceedingly high rates in both LMPs and EXLMPs, relative to SMPs. This prescribing behavior is shared by all specialty groups except pediatricians, but is most pronounced among internists. EXLMP internists order injections for almost one-half of all their office patients (45.2 percent), a rate almost three times that of SMPs (16.2 percent).

There are no differences in X-ray utilization by size of Medicaid practice, and differences in office surgical rates are inconsistent, once broken down by specialty. General practitioners and internists in LMPs perform significantly more procedures while surgeons and EXLMP pediatricians perform fewer. The absolute levels of office surgery are generally low, however, in all groups.

INPUTS

In addition to his or her own time, the primary inputs to the physician's practice are auxiliary staff, such as clerical and nursing personnel. Physicians vary considerably, however, in the number and type of such personnel and in the effectiveness with which they employ them. If large Medicaid practices are more efficient in their use of auxiliary staff, this may explain their higher practice volume. By delegating tasks to clerical and nursing staff, these physicians may increase their total productivity (visits per physician hour) and lower average costs per visit. Alternatively, large Medicaid practices may skimp on such inputs in order to lower practice costs and increase physician net revenues.

LMPs employ significantly more nonphysician personnel, notably clerks, LPNs, and nurse practitioners, 2.6 on average compared with 2.1 for SMPs. Their higher use of LPNs may partially explain why LMP physicians see more patients per hour, while more clerical personnel may be necessary to handle the added administrative work associated with Medicaid reimbursement. The EXLMPs, however, do not employ significantly more clerks than SMPs, suggesting that they either find Medicaid administrative procedures less onerous or that they have become more proficient in obtaining payment. Although total staff-to-physician ratios are not higher in EXLMPs, these practices do use significantly more nursing personnel, both RNs

TABLE 4
Gross Revenues, Costs, and Markups Per Visit by Specialty by Size of Medicaid Practice

Specialty/Income or Cost Category	Medicaid practice Size			
	None	Small	Large ¹	Extra-Large ¹
General Practitioner				
GR/V	\$16.22	\$14.13	\$11.28	\$ 9.26
C/V	7.31	5.38	4.24	4.49
NET R/V	8.91	8.76	7.04	4.76
General Surgeon				
GR/V	25.93	20.96	22.46	14.29
C/V	7.89	6.22	8.90	6.44
NET R/V	18.04	14.74	13.56	7.85
Internist				
GR/V	18.76	18.41	13.24	20.40
C/V	6.37	6.40	5.80	7.58
NET R/V	12.39	12.01	7.44	12.82
OB-GYN				
GR/V	20.02	23.25	22.03	15.78
C/V	7.48	8.34	8.71	6.54
NET R/V	12.54	14.91	13.32	9.24
Pediatrician				
GR/V	15.87	11.79	12.00	9.08
C/V	5.28	4.50	4.87	4.39
NET R/V	10.59	7.29	7.13	4.69
Total				
GR/V	17.94	17.18	15.31	11.75
C/V	6.99	5.99	6.19	5.24
NET R/V	10.95	11.19	9.12	6.51

¹Excludes high income Medicaid practices (over \$80,000)

GR/V = gross revenues per visit

C/V = practice costs per visit

NET R/V = net revenues per visit (markups)

and LPNs. This suggests that EXLMP physicians may delegate more medical tasks than other physicians.

Discriminant Analysis of Large Versus Small Medicaid Practices

Physicians with a large proportion of Medicaid patients appear to differ from SMP physicians in significant ways, such as credentials, caseload, practice style and net incomes. Many of these characteristics are interrelated, however, and cross-tabular analysis does not adequately adjust for this. If large Medicaid practices are truly different from smaller Medicaid practices in ways that affect quality of care, we should be able to statistically distinguish between the two groups.

How might we identify Medicaid mills from large Medicaid practices generally? First, it seems reasonable to assume that Medicaid mill physicians are successful at what they do. That is, we would expect them to be earning higher incomes on average. Second, the process of medical care will be significantly poorer in mills, as measured by shorter visit lengths, higher rates of ancillary utilization, and fewer inputs. While Medicaid mills may be run by less well-trained physicians, this is not a necessary condition for a mill. Nevertheless, for policy purposes, we are concerned about a relative lack of training in LMPs, as this will restrict access by the poor to specialized services. If LMPs (and EXLMPs) are a unique group, then a discriminant function with these variables (income, process measures of quality, and credentials) should distinguish them from other physician practices. Discriminant analysis is used to analyze two groups of practices: small and large Medicaid practices. (Non-participants are omitted from this analysis.) Since practice characteristics are often different in LMPs and EXLMPs, we will derive two discriminant functions: 1) where LMPs are defined as practices with 30 percent or more Medicaid patients (which we will call MILL1 for identification purposes), and 2) LMPs defined as at least 50 percent Medicaid patients versus all other Medicaid practices (MILL2).

Three sets of discriminating variables are included with each function: income, process measures of quality, and credentials. In order to adjust for differences in hours worked, the income variable is defined as the physician's imputed hourly wage (MDWAGE). Physicians in large Medicaid practices are hypothesized to be distinguished by their higher net earnings, all else being equal.

If large Medicaid practices tend to be mills, then they should be characterized by lower quality care on all dimensions. In particular, physicians in these practices should spend less time with patients, order more ancillary services, and employ fewer aides. The variable LOV, the length of time spent with each office patient, is measured in fractions of an hour. The variables TEST, SHOT, XRAY and SURG are specified as the percent of office patients for whom the physician ordered laboratory tests, injections, X-rays, and office surgery, respectively. AIDE is the number of auxiliary staff employed in the practice, and is expressed as fulltime equivalents per physician.

Physician credentials include specialty, board-certification, FMG status, age, and hospital affiliations. These variables are included in part as adjustments for the process measures; variations in ancillary utilization, for example, between the two groups may reflect differences in specialty mix. Physician credentials are also of analytical interest in their own right. LMP physicians should be distinguishable from their colleagues as older, general practitioners and foreign medical graduates, without board certification or hospital affiliation. Specialty is specified as four dummy variables, GS, IM, OB, and PED for general surgeons, internists, OB-GYNs, and pediatricians, respectively. General practitioners constitute the omitted category. BOARD and FMG both assume the value of one if the physician is board-certified, or if he or she is a Third World FMG. The variables MDAGE and HOSAFIL, are set equal to one if the physician is 60 years or older, and if he or she lacks hospital affiliations, respectively.

EMPIRICAL FINDINGS

Means of the discriminating variables and the results of the analysis are presented in Table 5. The statistically significant coefficients associated with many of the variables indicate that both functions do discriminate between the two groups. A negative sign indicates that large Medicaid practices share a particular characteristic, for example, more FMGs, and that this characteristic distinguished them from smaller Medicaid practices.

MDWAGE, the physician's imputed net hourly wage, is a significant discriminatory variable in both functions. Regardless of how we define large Medicaid practices, physicians in these practices are distinguished from smaller Medicaid practices by their lower per hour earnings.

Six process measures of quality were included in the analysis. If large Medicaid practices were mills providing poor quality care, then the four ancillary service variables (TEST, SHOT, XRAY, and SURG) should have significant negative coefficients, and the coefficients for the input variables (LOV and AIDE) should have significant positive signs. Based on prior expectations, LMPs have only a single mill-like characteristic: physicians in these practices do order significantly more injections. The relative magnitude of this variable nevertheless indicates that SHOT is a powerful discriminatory variable. Unmeasured casemix variations might account for some of this difference, although specialty does provide a partial adjustment. Nevertheless, the fact that only one of six quality measures is suggestive of poor care in LMPs contradicts the general notion that mills and large Medicaid practices are synonymous.

Credentials, however, clearly separate the LMP physician from his SMP counterpart. In the first discriminant function, we see that large Medicaid practices are characterized by their higher proportion of specialists. These specialists tend to be less qualified than those in SMPs, however, in terms of FMG status and board certification. When we define LMPs as at least 50 percent Medicaid (MILL2), LMPs

do not differ from other practices in their mix, except for fewer internists. Again, they are less likely to be run by board-certified physicians. The FMG variable is also significant, but with the opposite sign. LMPs, however defined, are run by older physicians without hospital affiliations. Nevertheless, their relative lack of credentials does not qualify them as mill operators; instead, many are undoubtedly running LMPs by default rather than by design. These may be aging general practitioners, for example, who have become isolated in inner-city or rural areas by historical forces, and now serve a primarily low-income population.

High Income LMPs: Are They Medicaid Mills?

While it does not appear that most LMPs are Medicaid mills, there is a class of LMPs which deserves special attention, namely that where physicians earn unusually high incomes (HILMPs). HILMPs

were defined as those in which physicians reported net incomes of \$80,000 or more. Considering the presumably lower Medicaid fees they receive for a large percentage of their patients, how do they manage to enjoy incomes so much higher than other LMPs with similar revenue constraints? Even more puzzling is why their incomes are over 50 percent higher than the average income of a physician operating a small Medicaid practice, when the latter should be receiving higher fees. Clearly, LMP physicians at the tail of the income distribution are either much more productive than the average physician, receive unusually high fees, generate a much larger number of profitable ancillary services, or cut costs inappropriately. Does this subset of all LMPs comprise the Medicaid mills so often maligned in Congressional testimony? A separate analysis of these practices may shed further light on the behavior of LMPs and the need for specific public action.

TABLE 5
Discriminant Analysis Results for Small Versus Large Medicaid Practices

Variables	Discriminant Functions		Means			
	MILL1	MILL2	MILL1		MILL2	
			SMP	LMP/EXLMP	SMP/LMP	EXLMP
MDWAGE	0.36 ⁵	0.47 ⁵	24.34	21.92	24.24	18.22
LOV	0.13	¹	0.33	0.31	0.32	0.33
TEST	¹	¹	35.23	37.12	35.46	38.01
SHOT	-0.75 ⁵	-0.40 ⁵	17.75	29.65	19.45	30.47
XRAY	¹	-0.14	14.32	15.73	14.54	15.42
SURG	0.16 ²	0.19 ³	4.74	3.89	4.71	2.44
AIDE	-0.24 ⁵	¹	2.11	2.52	2.17	2.43
BOARD	0.31 ⁵	0.38 ⁵	0.43	0.27	0.41	0.16
FMG	-0.16 ³	0.31 ⁵	0.05	0.11	0.06	0.02
MDAGE	-0.23 ⁵	-0.36 ⁵	0.29	0.36	0.29	0.46
HOSAFIL	-0.18 ⁴	-0.28 ⁵	0.01	0.03	0.02	0.05
GS	-0.30 ⁵	¹	0.21	0.18	0.21	0.10
IM	-0.35 ⁵	0.19 ³	0.21	0.26	0.22	0.15
OB	-0.52 ⁵	¹	0.10	0.07	0.10	0.03
PED	-0.11	-0.13	0.08	0.09	0.08	0.12
	$\lambda = 0.92^2$	$\lambda = 0.94^2$				
	$R_c = 0.29$	$R_c = 0.24$				

¹F-ratio insufficient for entry

²Associated chi-square statistic significant at 1 percent level

³F-ratio significant at 10 percent level

⁴F-ratio significant at 5 percent level

⁵F-ratio significant at 1 percent level

Table 6 provides some summary data on HILMPs, contrasting them with SMPs and other LMPs.³ Compared to their colleagues, HILMP physicians are older and much more likely to be foreign trained, but surprisingly more specialized. While 39.9 percent of SMPs are run by general practitioners, only 13.6 percent of HILMPs do not specialize. General surgeons and internists are disproportionately represented in the HILMP group, 72.1 percent versus 41.3 percent of SMPs and 39.5 percent of the other LMPs.

Although specialists generally see fewer patients per week and spend more time with each one, the HILMP group sees 15 percent more patients per week (Table 6). Most of the extra visits are provided in the hospital, which is consistent with the HILMP specialty mix. Particularly striking are the significantly shorter visit lengths; HILMP physicians spend 3.4 minutes less with their office patients compared to SMP physicians.

TABLE 6
Summary Characteristics: HILMPs vs. SMPs and Other LMPs

Characteristic	Medicaid Practice Size		
	SMPs	LMPs	HILMPs
Foreign Medical Graduate	12.2%	20.6%	22.9% ¹
Third World FMG	4.8%	8.9%	18.0% ²
Board Certification	42.8%	28.6%	36.8%
MD is 60 years or older	28.8%	33.7%	43.1% ²
Total Visits	169.2	190.5	206.2 ²
Length of Office Visit (mins.)	19.6	18.8	16.2 ³
Net Income	\$60,571	\$57,007	\$96,447 ¹
Imputed Hourly Wage	\$24.40	\$21.93	\$37.49 ¹

¹Significant from SMP mean at 10% confidence level

²Significant from SMP mean at 5% confidence level

³Significant from SMP mean at 1% confidence level

As HILMPs were originally identified by their conspicuous incomes, it is not surprising that net incomes in this group are \$36,000 higher on average than in SMPs. HILMP incomes ranged from \$101,453 for general practitioners to \$92,592 for pediatricians. As physician hours do not vary between groups, the imputed hourly wage varies directly with income and is consistent across all specialties, although insignificant for OB-GYNs. This is true even after earnings were adjusted using the hours worked equation described earlier. Holding demand, physician competition, and credentials constant, HILMP physicians still earn significantly more than physicians with a small Medicaid caseload.

How can we explain the greater earning power of these HILMP physicians? Part of the answer undoubtedly lies in their heavier caseloads, which they achieve by shortening the length of patient contacts. The high incomes of these physicians are also explained by the higher Medicaid fees they enjoy, \$10.51 for an office visit on average, compared with \$8.44 for SMPs and \$8.36 for other LMPs. Sixty percent of

⁴For more detailed specialty-specific comparisons, the reader is referred to Mitchell and Cromwell (1979).

HILMPs are located in the South, where State Medicaid programs tend to employ more generous reimbursement procedures in determining allowable fees.

Policy Implications

Although some HILMPs have mill-like characteristics, LMPs generally cannot be considered Medicaid mills as described by Senator Moss. Nevertheless, a primary goal of the Medicaid program, the integration of the poor into mainstream medicine, has not been completely attained. Davis and Reynolds (1976) have shown that unadjusted utilization rates may overestimate the impact of Medicaid in improving access of the poor to health care. It is also necessary to adjust for health status; the poor tend to be sicker and hence require disproportionately more services. Our findings suggest another dimension of Medicaid access that needs to be considered: the credentials of the provider.

Medicaid beneficiaries appear to constitute a secondary market, served by less qualified physicians. Increases in physician supply may widen this gap even further, as competition for private patients squeezes out the less well trained physicians, the FMG, and the older GP. To make what they feel is a "decent" living, these marginal practitioners may have to see a larger and larger number of Medicaid patients. Current policies, which set Medicaid fees at or well below those of other insurers, simply reinforce this two-tiered form of medicine. Access to ambulatory care, whatever the background of the physician, may be better than no care at all; it may even be adequate, but it is not equal.

We really know very little about the impact of basic program elements on the quantity and quality of physician services under Medicaid. From our previous research, we do know that raising Medicaid fee schedules does increase participation on average (Sloan, Cromwell, and Mitchell, 1978). Reducing payment delays and streamlining overall administration has a similar effect. More liberal benefits and eligibility requirements, on the other hand, actually encourage the development of LMPs (Mitchell and Cromwell, 1979), but we know almost nothing about the welfare losses associated with limited coverage.

The success of such changes in the Medicaid program may depend on the local distribution of the poor, the distribution of physicians, and the financial attractiveness of the private market. For example, if physicians and the poor are fairly evenly distributed across the population, then higher Medicaid fees could significantly improve access without fostering undesirable kinds of LMPs. If, however, the poor are highly segregated (as in many urban ghettos), higher fees may only result in larger and larger Medicaid practices. Additional research is needed on the elements of the Medicaid program which foster the growth of LMPs.

Because of the Moss investigations, LMPs have been subject to a blanket criticism, which essentially makes serving the poor a disreputable occupation. Exposés may discourage illegal behavior, but they may also have the unintended side effect of discouraging

altruistic physicians from expanding their practices in underserved areas. Current fraud and abuse activities, furthermore, do not address the credentials gap; they focus only on the over-utilizers. Program reform, on the other hand, should improve both access and quality of care, as more qualified physicians will be attracted to the Medicaid market, providing the poor with an alternative to Medicaid mills.

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