Physician Payments and Infant Mortality: Evidence from Medicaid Fee Policy

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With nine infant deaths per 1,000 births, the United States ranks below 20 other industrialized nations in terms of the infant mortality rate (U.S. House of Representatives, 1992). Congress has responded to this situation by dramatically increasing the number of pregnant women eligible for health insurance under the Medicaid program. As a result, the number of women 15–44 years old who were eligible for Medicaid coverage in the event of pregnancy grew by 140 percent between 1979 and 1990 (Currie and Gruber, 1994). However, even if these changes were effective in increasing the demand for care, they do not in themselves guarantee access to medical care. Many observers have alleged that there is a shortage of physicians, and especially of obstetrician/gynecologists (ob/gyns), willing to serve Medicaid patients (Janet Mitchell and Rachel Schurman, 1984; Physician Payment Review Commission, 1991). Hence, the increased demand for services generated by expansions of the Medicaid program could go unmet.

An alternative approach to improving birth outcomes is to focus on the supply side of the market, and in particular on Medicaid fee policy. The low fees paid by state Medicaid programs represent a potential deterrent to physician willingness to serve Medicaid patients, and a large body of research suggests that increasing the ratio of Medicaid fees relative to private sector fees will increase physician participation in the Medicaid program (cf. Sandra Decker, 1993). But increasing the number of physicians willing to serve Medicaid patients will not necessarily lead to improvements in rates of infant mortality, for two reasons. First, many poor women and children already receive care from clinics and emergency rooms, and increased Medicaid fees may cause patients to change their site of care without increasing the number of visits. Second, fee policy may have small effects due to the segregation of the poor into areas that are underserved by physicians.

In this paper we examine the effect of physician fees on infant mortality using state-level data from 1980 to 1992. Our estimates exploit the substantial variation in the ratio of Medicaid to private ob/gyn fees both over time, and across states. We also examine the relationship between the fee ratio and Medicaid expenditures, in order to draw out the cost implications of changes in Medicaid fees. Finally, we use the measure of Medicaid eligibility developed in Currie and Gruber (1994) to compare demand-side and supply-side policies.

We find that increases in the Medicaid fee ratio are associated with small, but significant, declines in the infant mortality rate. Our estimates suggest that raising the fee ratio by 10 percent lowers infant mortality by 0.5–0.9 percent. This result is robust to variation in the sample period and to the measure of the fee ratio. We also find that higher fees raise payments to physicians and clinics under the Medicaid program, but

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that these increases are at least partially offset by reduced payments to hospitals. As in Currie and Gruber (1994), we find that expansions of Medicaid eligibility also reduce infant mortality, but that they increase payments to both physicians and hospitals. Hence, our results suggest that raising Medicaid fees is at least as cost-effective as expanding eligibility as a means of reducing infant mortality.

I. The Role of the Physician in Improving Infant Outcomes

Decreases in infant mortality can occur through one of two channels: improvements in the underlying health of the fetus (often measured using birth weight), and increases in the intensity or efficacy of interventions undertaken to keep infants alive. Interventions can be quite expensive. Rachel Schwartz (1989) reports that although babies weighing less than 2,500 grams account for only 9 percent of the neonatal hospital caseload, they account for 57 percent of neonatal hospital care costs. Clinical studies suggest that providing appropriate prenatal care to high-risk women could significantly improve fetal health, and reduce the costs associated with caring for low-birth-weight infants.

Hence, Medicaid policy can affect infant mortality rates either by improving the utilization of prenatal care or by increasing access to expensive interventions during and after birth. Expanding Medicaid eligibility is likely to increase the number of woman and newborns receiving expensive hospital services. Hospitals that participate in Medicare are prohibited from refusing to treat, or from transferring, any woman already in labor (U.S. Office of Technology Assessment, 1987). Since uncompensated costs due to childbirth account for 17.4 percent of hospital's uncompensated care (Robert Saywell et al., 1989), it is not surprising that hospitals make every effort to enroll eligible pregnant women in Medicaid (Rachel Gold et al., 1993). Once enrolled, women and their newborns may receive more expensive services than they would otherwise; for example, Jennifer Haas et al. (1993) found that increases in Medicaid eligibility in Massachusetts were linked to increases in the use of cesarean delivery.

In contrast, physicians are not required to participate in Medicaid, and expanding eligibility will do little to increase a physician's incentive to participate. Hence, it would not be surprising to find that increasing Medicaid eligibility had little effect on the probability that a woman received prenatal care. Increasing fee ratios does provide physicians with an incentive to provide prenatal care services. However, if a high-risk woman does not seek care from physicians, then neither increased eligibility nor higher physician fees will improve birth outcomes. Thus, the relative efficacy of these two types of policies is ultimately an empirical question.

II. Methodology and Data

In order to see whether raising the fee ratio reduces infant mortality, we estimate models in which the infant mortality rate in a state and year depends on the lagged fee ratio, as well as state and year dummies. The lagged Medicaid fee ratio is used in order to allow for lags in the reaction of physicians to fee changes, and because if fee changes operate by encouraging the use of prenatal care, they will affect infant mortality rates with a lag. The year effects control for secular time trends in the infant mortality rate and in fee ratios. State effects control for any fixed state characteristics that might be correlated with both fees and outcomes. Thus, in this model the effect of Medicaid fee policy is identified by changes in fee ratios within states and over time.

There were also substantial increases in eligibility for the Medicaid program over the 1980's. If changes in fee ratios and changes in eligibility are positively correlated and eligibility expansions reduce infant mortality, then models that do not include eligibility could overstate the effects of changes in the fee ratio. Hence, we also estimate alternative models that control for the fraction of 15–44-year-old women in each state and year who would be eligible for Medicaid coverage in the event of preg-

nancy, calculated using the Current Population Survey.

The infant mortality rate is the percentage of infants who die within the first year of life. Data for the full sample of births in each state and year come from Vital Statistics. For 1979–1988, we use the final reports, while for 1989–1992 we use preliminary statistics. In addition to models of infant mortality, we estimate models with Medicaid expenditures as the dependent variable. States report payments made under the Medicaid program to the Health Care Financing Administration each year. These reports break down expenditures by class of provider and by recipient category, but not by type of service (i.e., childbirth) or by detailed population category (i.e., pregnant women and infants). We focus on expenditures on physicians, clinics, and inpatient and outpatient hospital costs for all nondisabled children and nondisabled/nonelderly adults, normalized so that they are per woman 15–44 years old. All figures are in $100's of 1986 dollars. Expenditures for hospital inpatient and outpatient services are deflated using the Consumer Price Index for hospital services, while expenditures for physician and clinic services are deflated using the Consumer Price Index for physician's services.

Our key regressor is the ratio of Medicaid to private fees for ob/gyns. There are no annual state-level data available on relative Medicaid fees. We construct the numerator using data on Medicaid fees for ob/gyns by state and year taken from a number of sources. When it is available, we use fees paid to specialists for total obstetrical care for vaginal delivery. For some states, only the delivery fee and the fee per prenatal visit is reported. In these cases we follow the Alan Guttmacher Institute (1987) in assuming that the average pregnant woman receives 8.7 prenatal visits and one postnatal visit, and we use these figures to estimate the appropriate "global" fee.

We do not have private fees by state and year. Hence, we construct the denominator of our series using the private fee for vaginal delivery in each state in 1989 from Anne Schwartz et al. (1991) and use data on annual hospital cost inflation (American Hospital Association, various years) to deflate this figure backwards and forwards. Finally, we adjust our estimated fee ratio using a point-in-time estimate of the true fee ratio in each state from Schwartz et al. (1991). Table 1 shows the fee ratios for six large states in 1979, 1987, and 1992, as well as the change over the entire period for each state. On average, over this period, the fee ratio increased by 2.9 percentage points. However, the fee ratio actually fell in 20 states, while it rose in 25 others. See Currie et al. (1994) for a detailed discussion of these series.[1]

Our other regressor of interest is the percentage of 15–44-year-old women who would be eligible for Medicaid coverage in the event of pregnancy in each state and year. A detailed discussion of this eligibility measure is provided in Currie and Gruber (1994).[2] Until 1984, eligibility for Medicaid was primarily limited to single mothers receiving cash welfare. Beginning in 1984, states were first given the option and then required to extend Medicaid coverage to pregnant women who were not eligible for cash welfare, either because of family structure or because of their family incomes. Table 1 shows our measure for six large states in 1979, 1986, and 1992. Nationally, the percentage of women eligible in the event of pregnancy rose from 14.2 percent to 34 percent.

III. Results

Estimates from our basic model are shown in Table 2. Higher fee ratios (row 1) have a statistically significant negative effect on in-

[1]Note that we are missing data for Alaska, Kentucky, Texas, and Wyoming. The working-paper version of this paper (Currie et al., 1994) also discusses results using fee ratios constructed using several alternative sets of assumptions. The results are generally similar to those reported here.

[2]Actual eligibility depends on state characteristics, such as the fraction of the population who are poor. We construct a "simulated" eligibility measure that depends only on state Medicaid policy. This is the measure used here.

TABLE 1—RATIOS OF MEDICAID FEES TO PRIVATE FEES, AND CHANGES IN ELIGIBILITY, BY STATE

A.	Fee ratios			
State	1979	1986	1992	1992 − 1979
CA	0.35	0.30	0.37	0.02
FL	0.32	0.27	0.51	0.18
IL	0.44	0.42	0.56	0.12
NY	0.11	0.22	0.25	0.15
OH	0.65	0.42	0.45	−0.20
PA	0.17	0.10	0.32	0.15
B.	Fraction of 15–44-year-old women eligible			
State	1979	1986	1992	1992 − 1979
CA	0.19	0.25	0.44	0.25
FL	0.08	0.14	0.35	0.17
IL	0.13	0.17	0.32	0.19
NY	0.19	0.22	0.41	0.29
OH	0.13	0.17	0.32	0.19
PA	0.14	0.19	0.31	0.17

TABLE 2—COEFFICIENTS ON THE MEDICAID FEE RATIO

Dependent variable	Fee ratio	R^2
Infant mortality	−0.556	0.924
	(0.266)	
Physician expenditure	0.096	0.703
	(0.051)	
Clinic expenditure	0.106	0.577
	(0.057)	
Hospital expenditure	−0.212	0.745
	(0.258)	
Total expenditure	−0.010	0.792
	(0.278)	

Notes: All regressions include a full set of state and year dummies. Standard errors are reported in parentheses. There are 585 observations.

fant mortality. The point estimate implies that raising the fee ratio by 100 percent would lower the infant mortality rate by 0.56 deaths per 1,000 births. The mean infant mortality rate over this period was nine births per 1,000, so this is a fairly small effect for a large change in fee ratios. The remaining rows of Table 2 provide some evidence about the cost-effectiveness of decreasing infant mortality by increasing fee ratios. In the second row, we regress real physician expenditures under the Medicaid program (in 100's of 1986 dollars) on the fee ratio. These estimates suggest that raising the fee ratio by 100 percent would raise physician expenditures under the Medicaid program by $9.60 per 15–44-year-old woman. The average fertility rate over this time period was 0.065 births per year for this age group, which implies that the increase in physician expenditures amounts to $263,736 per infant life saved.[3]

The remaining rows of Table 2 examine effects on payments to other providers. Paying higher fees to ob/gyns appears to *increase* expenditures on clinics, in contrast to the finding of Stephen Long et al. (1986). On the other hand, the estimates in row 3 indicate that a 100-percent increase in the fee ratio actually *decreases* expenditures on hospitals by $21.20, although the point estimate is not statistically significant. The net result, shown in the final row, is that increasing the fee ratio has an insignificant effect on total Medicaid expenditures. Thus, fee ratio increases appear to be a "free lunch"; mortality is lowered without increasing Medicaid expenditures.

The working-paper version of this paper (Currie et al., 1994) presents several tests of the sensitivity of these results to changes in the construction of the fee ratio. The results are remarkably robust with one exception: because we had to interpolate data from 1980 to 1982, we reestimated our models using only data from 1983 to 1992. The estimated effects on infant mortality become even larger, but the estimates in models of expenditures are sensitive to the choice of time interval. These models imply that the cost of saving a life by increasing fee ratios is $1,259,875, which suggests that perhaps there is no such thing as a free lunch after all.

Estimates from models that include the fraction eligible as well as fee ratios are shown in Table 3. The effects of the fee ratio are similar to those discussed above.

[3]This calculation is done as follows. For a 100-percent increase in the fee ratio, there is a rise in Medicaid physician expenditures of $9.60 per 15–44-year-old woman. Since the average fertility rate in this group is 6.5 percent, this amounts to a cost increase of $147.70 per birth, or $147,700 per 1,000 births. This saves 0.56 infant lives per 1,000 births, for a cost per life saved of $263,756.

TABLE 3—COEFFICIENTS ON FEE RATIOS AND ON THE FRACTION ELIGIBLE

Dependent variable	Fee ratio	Fraction eligible	R^2
Infant mortality	−0.464	−3.206	0.926
	(0.265)	(0.999)	
Physician expenditure	0.083	0.469	0.706
	(0.051)	(0.192)	
Clinic expenditure	0.112	−0.185	0.577
	(0.057)	(0.214)	
Hospital expenditure	−0.292	2.777	0.749
	(0.258)	(0.973)	
Total expenditure	−0.098	3.050	0.795
	(0.277)	(1.045)	

Notes: All regressions include a full set of state and year dummies. Standard errors are reported in parentheses. There are 585 observations.

As in Currie and Gruber (1994), we find a sizable and statistically significant negative effect of increased Medicaid eligibility for pregnant women on the infant mortality rate. Eligibility expansions also increase Medicaid expenditures, particularly on hospitals. Altogether, making one more woman eligible for Medicaid costs $305, implying a total cost per life saved of $1,463,602 (although this may be an overestimate since we have not accounted for possible reductions in uncompensated care for maternity). Once again, our point estimates from the full sample imply that raising fee ratios reduces clinic and hospital expenditures, so that there is no net effect on total expenditures. But it is important to note that, if we use the 1983–1992 subperiod, expanding eligibility and increasing fee ratios appear to be equally effective.

IV. Conclusions

In summary, this paper provides evidence that closing the gap between private fees and fees paid to doctors under the Medicaid program is an effective way to reduce infant mortality rates. A question we have not addressed is *how* fees reduce mortality. For example, if mortality falls without increasing the total number of visits to all types of providers, then our results could be interpreted as powerful evidence of the superior quality of physician care. Other issues that need to be addressed are possible changes in other state Medicaid fees that may have coincided with changes in fees for ob/gyns, and possible decreasing returns to increases in fees and eligibility.

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