Access to Care, Provider Choice, and the Infant Health Gradient

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Children born to poor parents in the United States are more than twice as likely to die within the first year as those born to higher-income parents (Steven Gortmaker and Paul Wise, 1997). It has long been hypothesized that these differences are due, in part, to unequal access to care. In California in 1990, neonatal mortality rates for Medicaid births were 33 percent larger than for the privately insured and those with Medicaid were also 37 percent more likely to deliver in public hospitals than their privately insured neighbors. Differential use of providers may explain these differences in health if there are large differences across hospitals in the quality of care that affect infant health. The direct effect of hospital quality on health, however, is very difficult to measure (Mark McClellan and Douglas Staiger, 1999).

In this paper we explore whether, when granted access to those hospitals used by the privately insured, poor women choose to use them and if so, whether health gradients decline as a result.[1] There are two possible explanations for why poor women deliver in different hospitals than their privately insured neighbors. Existing evidence suggests that because of relatively low reimbursement rates, many providers are unwilling to treat Medicaid patients, constraining poor women's choice of provider (Janet Currie et al., 1995). It may also be that, even without such a constraint, poor women still choose alternative (lower-quality) providers, which would suggest a potential market failure.

To answer these questions we exploit an exogenous change in policy that occurred in California in the early 1990s that suddenly increased Medicaid payments to hospitals and increased the willingness of hospitals to serve Medicaid patients.[2] We focus on pregnant women because they constitute a large fraction of the Medicaid population, and they have adequate time to choose a hospital for delivery, and also because there is evidence that access to high-quality care can affect neonatal mortality (David Cutler and Ellen Meara, 1999).

I. Data

We use California birth-certificate data matched to death-certificate data from 1989 through 1995. These data contain individual-level records of all the births that occurred in California and include infant characteristics such as gestational age, birth weight, and mortality as well as maternal characteristics such as age, education, race, marital status, type of insurance coverage, zip code of residence, and prenatal care. The hospital of delivery and its location are also recorded.

We restrict our sample to native-born mothers ages 20 and older who had either Medicaid or private insurance,[3] delivered within 20 miles of their zip code, and were living in an urban zip code and in a county with three or more hospi-

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[1] Along similar lines, Amitabh Chandra and Jonathan Skinner (2003) have shown that blacks utilize lower-quality hospitals and suggest they do so due to their geographic proximity to such hospitals.

[2] See Mark G. Duggan (2000) for thorough explanation and analysis of this policy change.

[3] The foreign-born and those with other types of insurances are an unrepresentative group of mothers.

tals.[4] Because we focus on changes at the county level, we collapse all the individual births into cells defined by county, year of birth, maternal race, education, age, marital status, twin birth, and Medicaid status.

II. California's Disproportionate Share (DSH) Program

In the 1980s the federal government passed legislation that allowed the states to compensate hospitals that served a disproportionate share of disadvantaged patients and provided federal matching funds for DSH reimbursements. California's DSH program was created at the end of 1990. It stipulated that hospitals whose Medicaid (and indigent-related) costs (referred to as a hospital's low-income number or LIN) exceed 25 percent in the previous year would receive substantial per diem reimbursements. These reimbursements further increased as a function of LIN above 25 percent. Funds were first received by hospitals in fiscal year 1991–1992.

Because of its generosity, the DSH program provided an incentive for many private hospitals to drastically increase the number of Medicaid patients that they served. As a result, in a short period of time, there was a large redistribution of Medicaid patients from public to private hospitals, but there was almost no change in the type of hospitals chosen by privately insured mothers over this period (Duggan, 2000; Aizer et al., 2003). We treat the payment increase introduced by DSH as an exogenous increase in the hospital choice set for Medicaid expectant women. We assume throughout this paper that mothers choose the hospital where they deliver.[5] Note that because Medicaid covers all birth-related expenses, income and direct costs do not play an important role in determining hospital choice for this sample.

III. Trends in Hospital Use

To characterize the change in the distribution of Medicaid deliveries over this period within a mother's market (defined by the mother's county of residence; in our sample, 94 percent of mothers gave birth within their county), we calculate Hospital Segregation Index (HSI)[6] for each county and year as follows:

$$\mathrm{HSI} = \left(\frac{1}{2}\right) \sum_{i=1}^{n} \left| \frac{\mathrm{Mcaid}_i}{\mathrm{Mcaid}} - \frac{\mathrm{pvtpay}_i}{\mathrm{pvtpay}} \right|$$

where i indexes each hospital in the county. The first term is the number of Medicaid deliveries in hospital i over the total number of Medicaid deliveries in the county in a given year. The second term is similarly defined, but for privately insured deliveries. The segregation index ranges from 0 to 1, with 0 being unsegregated, and 1 being totally segregated. Levels above 0.6 are considered high (Douglas Massey and Nancy Denton, 1993). The HSI captures the extent to which Medicaid and privately insured mothers deliver in the same hospitals. Intuitively, the HSI represents the proportion of Medicaid (or privately insured) mothers who would have to switch hospitals for the county to be unsegregated. The index is not a function of the share of Medicaid mothers in the county.

Figure 1 shows the trends in hospital segregation throughout the period. Figure 1a shows the (unweighted) average across counties, and Figure 1b shows the average weighted by the population. The trends in the plots are similar, but the levels are much higher when we weight by population, because some of the largest counties (e.g., Los Angeles) have very high segregation. Prior to 1990, hospital segregation was rising. But the level of hospital segregation declines from 0.59 to 0.51 or 13.5 percent beginning in 1990–1991 (using the weighted means), coincident with the implementation of DSH. There is considerable variation across counties in the extent to which hospital segregation changed over this period. Most counties (63 percent) experienced a decrease in segregation, but segregation remained roughly the same or increased in others. The largest decline occurred in Riverside County (about 35 percentage points), and the largest increase occurred in Fresno.

[4] A zip code where less than 25 percent of the population lived in an urban area as of the 1990 Census is considered rural.

[5] Patient surveys suggest that patients play a significant role in choice of hospital (see Erik Berkowitz and William Flexnor, 1981).

[6] This index is also known as the dissimilarity index.

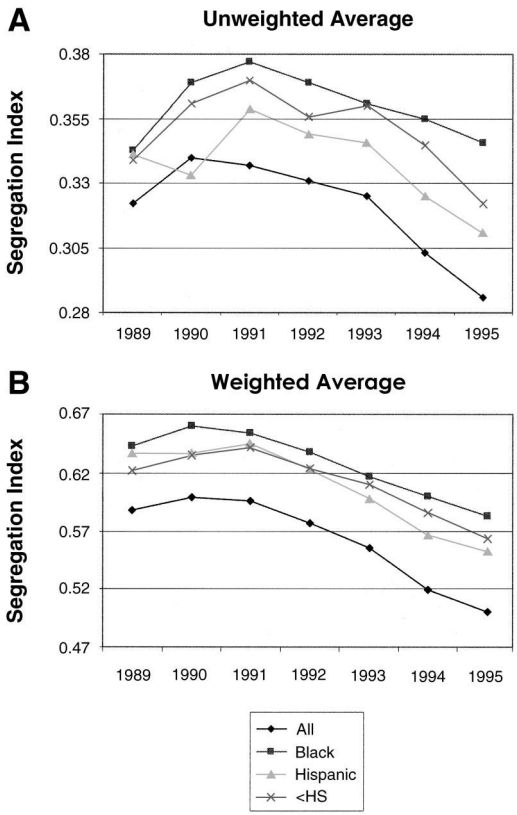

FIGURE 1. TRENDS IN COUNTY HOSPITAL SEGREGATION: (A) UNWEIGHTED AVERAGE ACROSS COUNTIES; (B) AVERAGE WEIGHTED BY POPULATION.

Figure 1 also depicts trends in segregation for three different subgroups: Hispanic mothers, black mothers, and mothers without a high-school degree.[7] Overall, it appears that Hispanic mothers and high-school dropouts experience the same decline in segregation as the general population of Medicaid mothers (though the initial levels are higher). Black Medicaid mothers appear to be the exception, experiencing much smaller declines in segregation relative to non-black Medicaid mothers. Formal tests confirm that only the post-1991 decline in hospital segregation for blacks is significantly less steep than it is for other groups (Aizer et al., 2003).

[7] The share $\text{pvtpay}_t/\text{pvtpay}$ is the same for all indexes.

IV. The Effect of Hospital Desegregation on Infant Health

We present difference-in-differences (DD) estimates comparing the differences in birth outcomes for Medicaid mothers versus privately insured mothers in areas that witnessed large declines in segregations versus those in areas with small or no declines in segregation, as represented by β_1 in the following equation:

$$\begin{aligned}\text{health}_{gtc} &= \beta_0 + \beta_1[\ln(1 - \text{segregation}_{tc}) \times \text{Medicaid}_{gtc}] \\ &+ \beta_2(\text{Medicaid}_{gtc}) + \beta_3[\ln(1 - \text{segregation}_{tc})] \\ &+ I(1995 = 1) + \gamma_c + \mathbf{X}_{gtc}\boldsymbol{\delta} + \varepsilon_{gtc}\end{aligned}$$

where $\mathbf{X}$ is a set of age, race, foreign-born, and marital-status dummies. The dependent variable is neonatal mortality for a given group g in year t and county c. The standard errors are clustered at the county level. We choose ln(1 − segregation) as our measure of desegregation because changes in desegregation appear to have a greater impact in areas where segregation was initially high. The Medicaid indicator controls for any underlying differences in neonatal mortality between Medicaid and privately insured mothers. County dummies control for differences between counties, and the year dummy controls for state-wide trends in neonatal mortality. Therefore β_1 is identified from changes in segregation within counties over time. This coefficient captures the health benefits that accrued to Medicaid mothers who moved to hospitals that previously served mainly the privately insured. If desegregation results in a decline in neonatal mortality, β_1 (the DD estimate) will be negative.

As expected, the DD estimate is small and insignificant for the entire sample (Table 1A). This is consistent with our expectations that increasing access to care would not matter for the average mother but only for those at the highest risk and with Duggan (2000), who also found no effects on average.

The results for mothers at risk of poor outcomes are in the next three columns. For blacks, the interaction term is negative and significant at the 10-percent level. The coefficient suggests that a decline in segregation of 0.096 (the

TABLE 1—IMPACT OF HOSPITAL DESEGREGATION ON NEONATAL MORTALITY

Variable	All	Black	<HS	Hispanic
A) *Singleton Births:*				
Medicaid × ln(1 − HSI)	0.0004	−0.0023	0.0009	0.0002
	(0.0003)	(0.0013)	(0.0005)	(0.0011)
ln(1 − HSI)	−0.0007	0.0027	−0.0036	−0.0029
	(0.0005)	(0.0016)	(0.0012)	(0.0012)
Medicaid	0.0016	−0.0003	0.0019	0.0008
	(0.0004)	(0.0016)	(0.0006)	(0.0012)
Mean neonatal mortality	0.0041	0.0079	0.0040	0.0057
B) *Twins:*				
Medicaid × ln(1 − HSI)	−0.0118	−0.0785	−0.0115	−0.0294
	(0.0043)	(0.0349)	(0.0193)	(0.0182)
ln(1 − HSI)	0.0123	0.0354	0.0090	−0.0058
	(0.0139)	(0.0621)	(0.0143)	(0.0282)
Medicaid	−0.0162	−0.0788	−0.0164	−0.0234
	(0.0064)	(0.0344)	(0.0140)	(0.0209)
Mean neonatal mortality	0.0226	0.0399	0.0145	0.0278

Notes: Standard errors (in parentheses) are clustered at the county level. Regressions are weighted by the number of observations in each cell, and they include county fixed effects. Controls include race, marital status, high-school dropout and age dummies, a dummy for twin births, and HMO penetration.

average over this period) results in a decline in black neonatal mortality of 0.000552 percentage points, or about 7 percent of the mean neonatal mortality.[8] The coefficients for high-school dropouts and Hispanics suggest that desegregation had no impact on neonatal mortality for these groups. This could be a result of their lower initial rates of neonatal mortality, suggesting declining marginal productivity of neonatal care.

Because women carrying twins are readily predicted to be at higher risk of poor outcomes, we anticipate that desegregation should have a greater impact on birth outcomes for twins than singleton births. The results for twins only (Table 1B) suggest that desegregation has a larger impact on neonatal mortality among twin births than singleton births for all mothers and for black mothers. Both coefficients are significant at the 5-percent level. They imply very large effects: for all twins, the decline in segregation resulted in a 12.5-percent decline in neonatal mortality, and for black twins the decline was about 42 percent. However, we still find no significant effects for high-school dropouts or Hispanic mothers.[9]

V. Interpretation and Implications

We have found that implementation of DSH, which effectively increased Medicaid payment rates for hospitals that qualified, resulted in substantial desegregation of poor publicly insured mothers from separate, often public, hospitals. Interestingly, within Medicaid, most subgroups defined by race, ethnicity, or education took advantage of the increase in access at roughly similar rates, with the exception of one group—black mothers. Ironically, it is black mothers who benefited the most from the increase in provider access in terms of reduced neonatal mortality: about 70 percent of the decline in their neonatal mortality is due to the decline in hospital segregation.

Several conclusions can be drawn from these findings. First, differential access to health care is still an important determinant of health for blacks and has not been eliminated through expansions in public health insurance. Yet simply expanding the number and quality of hospitals available to blacks is not sufficient to induce them to utilize higher-quality care, as evidenced by our finding that blacks (who stood to gain the most) moved the least. Second, the fact that we find significant improvements in birth outcomes only among those with the highest initial levels of mortality (blacks and twins) suggests that the marginal productivity of neonatal medical technology is declining. As a result we should expect further increases in access to care to result in smaller improvements in neonatal mortality. Also, it suggests that hospital quality may matter only for extreme cases. Thus it may not be surprising to find small or no effects of hospital quality on health for the average patient.

Finally, the fact that black mothers moved at lower rates could be a sign of inefficiency in the hospital market—either a lack of information or possible discrimination. It is also possible that black mothers have higher costs of switching

[8] Note that the effect of a change of −0.096 is given by $\beta[1/(1 - \text{HSI})](-0.096)$.

[9] Ciaran S. Phibbs et al. (1993) also find that hospital quality tends to be more important for high-risk women.

hospitals relative to other mothers. As to why other Medicaid mothers moved, even though they appeared to have received no benefit, we can think of two distinct reasons. One is that these mothers moved because private hospitals offered amenities that these mothers value but that are not related to the quality of care provided. Alternatively these mothers value *ex ante* the availability of high-quality care given the risk, though low, of birth complications. In either case the finding that mothers took advantage of the increase in access by choosing alternative hospitals implies that their choices were previously constrained and that DSH improved their welfare. This suggests that an evaluation of the social benefits of programs such as DSH should include improvements in welfare that are not captured solely by changes in objective measures of health such as infant mortality.

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