Impact of Immigration on Prenatal Care Use and Birth Weight: Evidence from California in the 1990's

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The mid-1990's witnessed the passage of two legislative measures restricting noncitizens' use of public services in response to the extensive and costly use of public assistance by immigrants reported by earlier studies (Jane L. Ross, 1996). First, the Immigration Control and Financial Responsibility Act restricted illegal immigrants' access to medical services and to other forms of public assistance. In addition, the Personal Responsibility and Work Opportunity Reconciliation Act extended the restriction to legal immigrants entering the country after its enactment for at least five years after entry and effectively until they naturalize. However, some states with large immigrant populations, like California, chose to institute state-funded substitute benefits for immigrants losing federal assistance. In spite of these states' assistance possibly working as an "immigrant magnet" (George J. Borjas, 2001), the literature emerging after welfare reform has often found a greater decline in the use of public assistance, particularly Medicaid, among noncitizen households relative to citizens. This finding has been attributed to the "chilling effects" of welfare reform (Wendy Zimmermann and Michael Fix, 1998).[1]

In light of these findings, should we now expect greater noncitizenship rates to ease access to public services or, rather, to impose a burden on access to public services? In this paper, we look into this question and examine the impact of noncitizenship rates on women's use of prenatal care (PNC) over the period 1991–2000 in California. We focus on women's PNC use given the health implications that PNC can have for both mother and infant, and yet the lack of studies examining the role of noncitizenship rates, even in high immigration areas, on women's PNC use. We use 1991 and 2000 to assess significant changes in the effect of noncitizenship rates on women's PNC use before and after the 1996 reform. Additionally, we focus on California due to its population size and its large immigrant population, of whom approximately 61 percent are noncitizens. Finally, given the implications of adequate PNC on newborns' birth weight through the early detection and treatment of any existing health problems, we examine how PNC, in turn, has affected the birth weight of babies born in California over the examined time period.

In sum, this study addresses the following questions: Has the effect of noncitizenship rates on women's PNC use changed before and after the 1996 reform? In particular, do greater noncitizenship rates result in reduced PNC use due to increased competition for public services, or do they lead to increased PNC use due to welfare reform's "chilling effect" and increased awareness of the importance of PNC? Furthermore, how does PNC use affect birth weight?

I. Empirical Approach

The sample for this study consists of live births in California, and therefore, we follow the approach used by Mark R. Rosenzweig and T. Paul Schultz (1983) and Hope Corman et al. (1987) and estimate a reduced-form system composed of a birth-weight production function and a PNC-use function by three-stage least squares (3SLS). The model accounts for mothers' self-selection in the use of PNC. The selection problem arises because pregnant women who anticipate poor fetal health exhibit a greater use of PNC, whereas women anticipating a good birth outcome use fewer PNC services. In addition to the aforementioned adverse selection, there might also be a favorable selection in the use of PNC if healthy women interested in the successful completion of their pregnancies

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[1] Federal restrictions and differences in immigrants' eligibility rules for public services across states might have discouraged immigrants from applying for public assistance for which they were eligible due to confusion or intimidation.

start PNC earlier (Michael Grossman and Theodore J. Joyce, 1990).

Mothers' health endowment depends on exogenous factors, such as their gene pool or cultural background, and on endogenous factors, such as whether they have a healthy life style. We account for some of these factors by including mothers' race, foreign origin, educational attainment, and history of dead births. We include mothers' education due to its possible correlation with a healthier life style. Similarly, we use mothers' histories of dead births as a proxy for their health endowment. Additionally, we instrument for PNC use in the birth-weight equation by jointly estimating a reduced-form system composed of a birth-weight production function and a function for mothers' PNC use using 3SLS to obtain consistent and efficient estimates.

We estimate two models. The first model consists of the following system composed of a birth weight (bw_i) production function and a PNC use function (pnc_i) estimated separately for 1991 and for the year 2000:

$$(1) \qquad bw_i = \boldsymbol{\beta}_1 \mathbf{x}_i + \beta_2 pnc_i + u_{bi}$$

$$(2) \qquad pnc_i = \boldsymbol{\alpha}_1 \mathbf{y}_i + \boldsymbol{\alpha}_2 \mathbf{z}_i + u_{pnci}$$

where $\mathbf{x}$ is a vector including information regarding the birth, such as the type of birth (i.e., single or multiple), whether it was premature, and the infant's gender; the mother's personal characteristics, such as her age, race, marital status, foreign origin, educational attainment, and history of dead births; and the father's age and race. The vector $\mathbf{y}$ includes the mother's personal characteristics in $\mathbf{x}$, along with the father's educational attainment, method of payment for PNC, and information regarding the accessibility of PNC services. The method of payment for PNC is an important factor known to affect women's use of PNC (Bradley Gray, 2001). To proxy for mothers' accessibility to PNC services, we include the number of hospitals in mothers' counties.[2] The vector $\mathbf{z}$ contains noncitizenship and Medicaid eligibility rates in the mother's zip code as key factors influencing

women's PNC use. In particular, greater Medicaid eligibility rates may impose a financial constraint on institutions providing PNC services, irrespective of noncitizenship rates (Joyce, 1999; Janet Currie and Jeff Grogger, 2000).

Our second model pools the data for the years 1991 and 2000 to allow for a direct comparison of the growth in mothers' PNC use as a result of changes in noncitizenship rates pre and post 1996:

$$(3) \qquad bw_i = \boldsymbol{\beta}_1 \mathbf{x}_i + \beta_2 pnc_i + u_{bi}$$

$$(4) \qquad pnc_i = \boldsymbol{\alpha}_1 \mathbf{y}_i + \boldsymbol{\alpha}_2 \mathbf{z}_i + \alpha_3 t + \boldsymbol{\alpha}_4 t \mathbf{z}_i + u_{pnci}$$

where t stands for a dummy variable for the year 2000 that we interact with the proportion of noncitizens who are Medicaid-eligible at the mother's zip code. These interaction terms capture the growth rate in the mother's PNC use resulting from changes in noncitizenship and Medicaid eligibility rates in her zip code before and after welfare reform.

II. Data and Descriptive Analysis

We use data on mothers' PNC use and on their newborns' weight from the 1991 and 2000 California vital statistics. Frequent use of PNC may reflect pregnancy complications (Corman et al., 1987); therefore, we also account for the mother's health endowment. Data on the proportion of noncitizens at the zip-code level are collected from the 1990 and 2000 Censuses. Medicaid-eligibility rates at the zip-code level were provided by the California Department of Health Services.

Table 1 shows how women's PNC use declines as the percentage of noncitizens in their zip codes increases. The inverse relationship between women's PNC use and the fraction of noncitizens in their zip codes may reflect the competition for services or, alternatively, welfare reform's "chilling effect." Table 2 shows that birth weight increases with greater PNC use but starts to decline when the number of PNC visits exceeds 15, indicating the existence of pregnancy complications.

III. Results

Table 3 shows how, overall, the percentage of noncitizens residing in the mother's zip code

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[2] While the number of OB/GYN clinics or physicians is a better proxy for accessibility of PNC services, we were unable to find data at the zip-code level for 1991 and 2000.

TABLE 1—PNC VISITS BY PERCENTAGE OF NONCITIZENS
AT THE ZIP-CODE LEVEL

Year and percentage noncitizens	Percentage of sample	PNC visits	
		Mean	SD
1991			
<10	35.80	11.57	4.12
11–25	39.38	10.68	4.33
>25	24.82	9.70	4.30
2000			
<10	28.24	12.39	4.00
11–25	47.08	11.95	4.02
>25	24.68	11.83	3.90

TABLE 2—AVERAGE BIRTH WEIGHT BY NUMBER
OF PNC VISITS

Year and number of PNC visits	Percentage of sample	Birth weight (g)	
		Mean	SD
1991			
None	1.77	3,089.64	749.12
1–5	8.55	3,157.19	725.34
6–10	35.36	3,343.09	570.02
11–15	44.84	3,448.02	532.15
>16	9.48	3,385.56	605.07
2000			
None	0.61	3,003.26	774.21
1–5	3.67	3,072.78	832.59
6–10	27.75	3,309.61	604.95
11–15	53.85	3,409.74	534.26
>16	14.12	3,347.75	608.57

constitutes an important factor affecting her PNC use. In model 1, we classify mothers' zip codes into three categories according to the proportion of noncitizens in the zip code.[3] Relative to mothers residing in zip codes with smaller noncitizenship rates (less than 11 percent), mothers in zip codes with higher noncitizenship rates display lower PNC use in both years of our sample. However, the negative effect of higher noncitizenship rates on mothers' PNC use lessened over the decade, possibly as health awareness increased. From model 2, a 10-percent increase in noncitizenship rates in mothers' zip codes results in a 2-percent decline in their PNC use. The interaction term (Percentage NonCitizen × Year 2000) allows us to

[3] These categories refer to the first, second and third, and fourth quantiles of noncitizenship rates, respectively.

TABLE 3—THREE-STAGE LEAST-SQUARES ESTIMATION OF
BIRTH-WEIGHT PRODUCTION FUNCTION AND PNC USE

Independent variable	Model 1		Model 2
	1991	2000	
A. *Dependent Variable = Birth Weight:*			
PNC visits	0.0032	0.0020	0.0026
	(0.0001)	(0.0001)	(4.96×10^{-5})
Mother's dead-birth history	−0.0277	−0.0108	−0.0174
	(0.0016)	(0.0013)	(0.0010)
Foreign-born mother	0.0012	−0.0021	−0.0005
	(0.0007)	(0.0007)	(0.0005)
Infant's gender (male = 1)	0.0361	0.0350	0.0356
	(0.0005)	(0.0006)	(0.0004)
Single birth	0.2794	0.2783	0.2793
	(0.0018)	(0.0017)	(0.0012)
Premature birth	−0.2586	−0.2729	−0.2655
	(0.0009)	(0.0010)	(0.0007)
Chi-square:	153,391.1	151,888.4	305,099.8
B. *Dependent Variable = PNC Use:*			
Year 2000	—	—	−0.0057
			(0.0016)
Percentage noncitizen (11–25)	−0.0081	−0.0040	—
	(0.0014)	(0.0013)	
Percentage noncitizen (>25)	−0.0044	0.0033	—
	(0.0020)	(0.0018)	
Percentage noncitizen	—	—	−0.0016
			(0.0001)
Percentage noncitizen × Year 2000	—	—	0.0032
			(0.0001)
Percentage on Medicaid (11–25)	−0.0264	−0.0202	—
	(0.0015)	(0.0013)	
Percentage on Medicaid (>25)	−0.0527	−0.0208	—
	(0.0019)	(0.0018)	
Percentage on Medicaid	—	—	−0.0030
			(0.0001)
Percentage on Medicaid × Year 2000	—	—	0.0036
			(0.0001)
Foreign-born mother	−0.0591	−0.0220	−0.0401
	(0.0017)	(0.0014)	(0.0011)
Mother's dead-birth history	0.0337	0.0087	0.0190
	(0.0036)	(0.0024)	(0.0021)
Method of payment for PNC			
Uninsured	−0.1836	−0.1359	−0.1591
	(0.0024)	(0.0033)	(0.0019)
Fee for Service	0.0297	0.0481	0.0472
	(0.0016)	(0.0016)	(0.0011)
Medicaid	−0.1205	−0.0019	−0.0594
	(0.0016)	(0.0014)	(0.0011)
Other	0.0150	0.0010	0.0271
	(0.0033)	(0.0039)	(0.0025)
Hospitals in the county	0.0003	0.0011	0.0007
	(1.99×10^{-5})	(1.76×10^{-5})	(1.37×10^{-5})
Chi-square:	83,558.9	21,967.5	125,858.7
Observations:	500,000	440,000	950,000

Notes: The birth weight equation includes: mother's age, race, education, and marital status; and father's age and race. The PNC equation includes: mother's age, race, education, and marital status; and father's education. Percentage noncitizen less than 11 percent, percentage on Medicaid less than 11 percent, and HMO-financed PNC are reference categories.

distinguish whether the inverse relationship between noncitizenship rates and mothers' PNC use is due to the rival nature of PNC services or,

alternatively, due to the higher concentration of noncitizens unaware of their eligibility for PNC services ("chilling effect") in mothers' zip codes. When examining mothers' living in zip codes with identical proportions of noncitizens, we observe an increase in their PNC use over the decade. Therefore, mothers' increased awareness of the health implications of PNC use may have outdone the "chilling effect" caused by welfare reform, improving their PNC use.

In addition, Table 3 shows the impact of changes in Medicaid eligibility rates on mothers' PNC use. As with noncitizenship rates, model 1 groups mothers' zip codes into three categories according to the proportion of Medicaid eligibility in their zip codes.[4] Relative to mothers residing in zip codes with low Medicaid eligibility rates (below 11 percent), mothers in zip codes with a higher concentration of individuals on Medicaid display lower PNC use in both years of our sample, reflecting the increased competition for PNC services as Medicaid eligibility rates rise. Model 2 confirms this inverse relationship between increasing Medicaid eligibility rates and mothers' PNC use. However, when we examine mothers living in zip codes with identical Medicaid eligibility rates, PNC use increased before and after 1996, possibly due to mothers' increased awareness of the importance of PNC use over the decade.

We also find that mothers' cultural background, as proxied by whether the mother was foreign-born, has a significant impact on their PNC use, with foreign-born mothers' demanding on an average 4 percent fewer PNC visits (equivalent to half a visit) than their non-foreign-born counterparts (model 2). Foreign-born mothers' reduced PNC use may be explained by their cultural background or their lack of familiarity with the U.S. health system. Women's history of dead births is associated with greater PNC use, providing evidence of the adverse selection into PNC discussed in the methodology. Additionally, PNC use is lower when the method of payment is Medicaid relative to health maintenance organizations (HMO's). Accessibility to PNC services, as captured by the number of hospitals in mothers'

counties, increases women's PNC use. Table 3 also shows that birth weight increases with the number of PNC visits. In addition, birth weight is lower among mothers with a history of dead births and when the birth is premature, while it is higher for single versus multiple births.

Summarizing, this study yields two major findings. First, we find that greater noncitizenship rates reduced PNC use among mothers in California in the years 1991 and 2000. Secondly, we find that the fall in women's use of PNC services due to increases in noncitizenship rates was lower in 2000 than in 1991. This result may be explained by mothers' increased awareness of the health implications of PNC use, which may have outdone the "chilling effect" caused by welfare reform. Finally, we find that higher PNC use increases birth weight. Our findings highlight the significance of information campaigns that increase health awareness in overriding any "chilling effects" resulting from welfare reform.

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[4] These categories refer to the first, second and third, and the fourth quantiles of Medicaid eligibility rates, respectively.

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