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RACIAL AND RESIDENTIAL DIFFERENCES IN PREVENTIVE MEDICAL CARE OF INFANTS IN LOW-INCOME POPULATIONS

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ABSTRACT

Differentials in the use of preventive care were investigated for a sample of 123 rural white, urban white, and urban black infants from data reported by their mothers. The data were compared on two measures of preventive care for infants: immunization records, and frequency of well checkups. Immunization scores were highest for urban white children, followed by rural white children, and lowest for urban black children. However, urban black children had better scores for preventive checkups than rural white children.

Multiple Classification Analysis was used to identify specific demographic, economic, and accessibility variables that explain much of the race/residence differential in both measures. The author concludes that as demographic and economic differentials are narrowed among residence and race groups, the utilization differentials should also narrow. However, in order to improve accessibility to preventive care for infants, it is important to continue efforts to encourage mothers of newborns to establish ties with a place for regular preventive care.

Racial and Residential Differences in Preventive Medical Care of Infants in Low-Income Populations[1]

1. INTRODUCTION

Many observers have noted the inequities between rural and urban areas in the distribution of medical care facilities. Various federal programs, such as the National Health Service Corps, 1970, the Health Maintenance Organization Act, 1973, and the Rural Health Initiative Act, 1978, have been instituted to redress the imbalance. However, current national statistics indicate that rural residents are less likely than urban residents to utilize available medical facilities and services (NCHS, 1974). There is some evidence that this can be attributed only in part to differential availability; other factors, such as cultural patterns and types of medical service required, also appear to affect utilization patterns. Specifically, utilization patterns for illness care appear to be different from patterns of preventive care. Research has shown that rural residents go to the doctor for acute and chronic care when needed; they do not, however, seem to get the same amount of preventive care as urban residents. Preventive care has also been shown to vary directly with socioeconomic status. Those with more economic resources and education appear to utilize more preventive services than those with less resources and education.

This paper investigates differential patterns of use of preventive medical services for young children, an area of research that requires general medical consensus on standards of preventive care. For adults,

there is no clear consensus (Breslow and Somers, 1977). Fortunately, however, there is general agreement among medical sources on two types of preventive medical services for small children: immunizations for specific high-risk diseases, and routine physical examinations. Specialists in communicable diseases and child health generally agree that infants should receive immunization against diphtheria, pertussis, and tetanus (DPT), poliomyelitis, and rubella (Center for Disease Control, 1972, 1977). In addition, the American Academy of Pediatrics recommends that a baby be given a routine examination at birth, again within 2-3 months, and at 3-month intervals during the first year, making a minimum of four checkups by the age of 12 months. An additional checkup is recommended by the time the child is 18 months old (Christy, 1972).

Examining the social and economic factors influencing the use of preventive services requires a sizable amount of data on individuals and their medical behavior over a period of time. Retrospective recall data are often used, but limitations of this method are well documented (NCHSR, 1977). For this analysis, prospective data were available from interviews with mothers in urban and rural areas who gave birth in 1974, and who were re-interviewed at specific intervals until their infants were 20 months old. This technique is called the "bounded" interview, and reduces recall error by assisting the respondent to remember information by orienting past behavior to specific events.

2. PREVIOUS RESEARCH

Discussions of difficulties in obtaining health care in rural areas have been summarized by Hassinger (1976) and Copp (1976). Rural

area populations often reflect low income, lower educational attainment, and substandard housing, all of which impact on health. In addition, there is some evidence that lower proportions of rural residents have health insurance (NCHS, 1972). In some rural areas of the United States problems of language and racial discrimination also occur (Cordes, 1976). Other researchers suggest cultural differences in readiness to seek professional medical care. Farmers' well-known self-reliance and independence are often suggested as indicating a stoicism and pride in "making-do."

The National Health Interview Survey of 1967-68 indicates that metropolitan children see doctors more frequently than do children who reside in nonmetropolitan areas. The mean number of physician visits and the percentage of young children visiting a physician in the previous year, as well as the percentage of children who ever had a routine physical exam, were lower for children in nonmetropolitan areas (NCHS, 1971, 1977). In general, white children have better preventive health records than nonwhite children (NCHS, 1977). However, in urban areas current findings indicate little difference between white and nonwhite children in preventive care (Wan and Gray, 1978; Slesinger et al., 1976). Most work on preventive health behavior for young children has been done on the urban poor (Wan and Gray, 1978; Slesinger, 1976; German et al., 1976; Bullough, 1972), occasionally contrasted with the urban middle class (Slesinger et al., 1976).

3. THEORETICAL PERSPECTIVE

Two types of conditions have proved useful in examining the utilization of preventive medical services from a behavioral perspective.

"Predisposing" conditions are defined as sociocultural factors that incline an individual toward or deter him or her from using medical services. These include demographic and social characteristics as well as beliefs and values about health services. The second type, "enabling" conditions, includes personal resources which help the individual to secure services, such as income and health insurance, and availability of the desired services in the community (Andersen, 1968; Aday and Andersen, 1975; Andersen and Aday, 1978).

Hypotheses

In this research, six predisposing conditions were examined. Five are demographic characteristics: mother's age, education, and marital status, plus household composition and number of living children. Previous work with samples of urban children suggests the following hypotheses: utilization of preventive care will be positively related to age and educational level of mother; married mothers will utilize more preventive care than those who are single or who live alone with their children; and the greater the number of children in the household, the less preventive care will be utilized.

The other predisposing condition is the mother's attitude toward preventive health care. Health beliefs were examined through an index constructed from four items in the interview schedule that address the orientation of the mothers toward preventive care.[2] My hypothesis was that the more positive the mother's attitude, the greater the use of preventive care.

Four enabling conditions were investigated: two represent economic factors--poverty status, and type of health insurance available; two are measures of availability--type of medical delivery system used for well care, and travel time. I hypothesized that mothers in poverty will use less preventive care for their children: Mothers with no insurance will have the poorest records, those with Medicaid next, and those with private insurance the best records of preventive care. Mothers who do not name a specific place or provider for well care will have the lowest rates of utilization, and mothers who use private pediatricians will have the highest. Another hypothesis was that the longer the travel time to preventive services, the less they would be utilized.

I anticipated that all of these relationships would hold true both in urban and rural areas, and that the variation in the distribution of the predisposing and enabling conditions would explain the residential differences in level of care.

4. DATA SOURCE

This analysis is part of a larger study entitled Mothercraft and Infant Health (Slesinger, 1979), based on a group of 123 women from one urban and four rural Wisconsin counties who gave birth between June and December, 1974 and were followed for a period of about 17 months. The mothers were interviewed in their homes by public health nurses at three time points, when the infants were approximately 3, 12, and 20 months of age. At the first interview the mother was asked about the child's health, medical utilization, and illness since birth; at subsequent interviews

she was asked about the same topics since the time of the nurse's previous interview.

The purpose of the study was to measure mothering ability--especially "inadequate" mothering--among a group of women who had recently given birth, and to evaluate the effects of mothercraft on the health and development of the infant. This presented major problems in sampling, however, because the outcome variable--child health and development--would only be known after some time had passed, and because inadequate mothering is a difficult concept to both measure and locate in a random selection of recent mothers. A decision was made to design a sample which was based on case screening, yet which basically would represent mothers in urban and rural settings who face a variety of social and structural conditions suggested in the literature to affect quality of mothering (Polansky et al., 1975)--e.g., poverty, low educational level, large number of children with close spacing intervals, and very young age of mother. Mothers with indication of severe psychological problems, mental retardation, or infants with severe birth defects were excluded.

Description of Sample

The final sample mirrors the characteristics of low-income inner city residents as well as those of the rural poor. For example, according to a Census update (Palay, 1977), in the geographic area in Milwaukee from which the urban sample was chosen 60 percent of the population was black, which compares favorably with 69 percent of the Milwaukee sample. No black families lived in the sampled rural areas, a situation which accurately reflects the racial distribution in Wisconsin. Seventy percent of the sample

was at or below poverty level, as measured by the Social Security Index of income, family size, and farm or nonfarm residence (Community Services Administration, 1975). This ranged from 56 percent of the rural group to 85 percent of the nonwhite urban group. Eighty-four mothers lived in Miwaukee and 39 in four rural counties. Of the urban mothers, 25 were white, 58 were black, and 1 was American Indian. Only 37 percent of the Milwaukee mothers said they were married, compared with 87 percent of the nonmetropolitan mothers. No families in the sample, urban or rural, represent counterculture groups such as group families or communes.

In addition, with respect to infants' sex and birthweight, the sample is similar to national birth statistics. The sample is about evenly divided by sex, and 10 percent of the infants weighed less than 5 1/2 pounds at birth, compared to about 7 percent nationally (U.S. Department of Health, Education, and Welfare, 1975).

Inasmuch as the study group is not a probability sample of any specific population, the reader must regard the findings as suggestive. However, in general, both samples of women appear representative of urban and rural poor women who have recently given birth.

Description of Medical Facilities

The medical facilities in the five counties vary considerably. The metropolitan area contains ample medical facilities, including hospitals, out-patient clinics, public health clinics, and numerous physicians in private practice. One of the four nonmetropolitan counties contains a large private, nonprofit medical center, which,

although located in a small city (population 17,000), has a staff of over 150 medical specialists, and provides services to a large surrounding rural area. Two of the nonmetropolitan counties are totally rural and have no cities of 2,500 or larger. The fourth county has a city of 25,000 with a large general hospital but with few other physicians outside this urban area. None of the sampled mothers lived in the urban part of this county.[3]

5. METHODOLOGY

The present analysis proceeds in four steps. First, predisposing and enabling characteristics of the mothers are examined by the three race/residence categories, and differences in distribution are discussed. Second, the race/residence groups are examined with respect to the preventive care dependent variables: (1) the immunization score, which results from adding the child's record of shots and vaccines for DPT, polio, and rubella; and (2) the score of well checkup behavior over the first 20 months of the child's life. This is followed by an investigation of the effect of the predisposing and enabling conditions on the two dependent variables. Finally, those conditions that appear significantly related to the dependent variables are entered into a dummy variable regression model for each race/residence group separately. This procedure enables us to examine the interactions among race, residence, and the various predisposing and enabling conditions.

Multiple Classification Analysis (Andrews et al., 1967) was used to permit an investigation into nominal classification of the independent

variables, and also to produce a multiple correlation for each model. No linearity need be assumed in any independent variable. The results from this method produce statistics which permit comparison for models with and without controls. In this way, the race/residence groups may be compared, taking into account the effects of independent variables. Both dependent variables are interval scales, and the statistics to be examined are mean scores and adjusted mean scores.

6. FINDINGS

Characteristics of the Sample Population

Certain respondent characteristics vary considerably among the three subpopulations compared. Table 1 presents the distributions for each group, and indicates the comparisons that are significantly different using the Chi-square statistical test.

Predisposing conditions. There is a significant difference in the level of education between the metropolitan and nonmetropolitan mothers. Educational level is lower in the metropolitan area, with a much lower proportion having completed high school. Fifty-four percent of the nonmetropolitan mothers completed high school compared to 44 percent of the Milwaukee white mothers, and 25 percent of the nonwhite mothers.

There are also major differences in marital status among the groups. Eighty-seven percent of the rural mothers reported themselves

Table 1. Differences in Distribution of Race/Residence Groups on Predisposing and Enabling Conditions

	Total N	Distribution (%) Nmet[b] White	Met[c] White	Met Nonwhite	Level of Significance for Comparisons[a] Met vs. Nmet All	Met vs. Nmet White Only	Met Only White vs. Nonwhite
PREDISPOSING CONDITIONS							
Demographic							
Age					NS	NS	NS
14-19	23	20.5%	12.0%	20.3%			
20-24	55	35.9	60.0	44.1			
25-29	23	17.9	16.0	20.3			
30-46	22	25.6	12.0	15.3			
Education					≤.05	NS	NS
< High school graduate	76	46.2	56.0	74.6			
High school graduate	35	43.6	24.0	20.3			
> High school graduate	12	10.3	20.0	5.1			
Marital status					≤.001	≤.05	≤.001
Married	65	87.2	64.0	25.4			
Separated, divorced	13	7.7	8.0	13.6			
Single	45	5.1	28.0	61.0			
Household composition					≤.001	≤.05	≤.05
Mother, children	32	5.1	28.0	39.0			
Mother, male partner, children	66	79.5	60.0	33.9			
Mother, children, extended family	19	5.1	8.0	25.4			
Mother, male partner, children, extended family	6	10.3	4.0	1.7			
Number of children					NS	NS	NS
1	42	43.6	36.0	27.1			
2	36	25.6	32.0	30.5			
3	16	12.8	16.0	11.9			
4-11	29	17.9	16.0	30.5			
Beliefs							
Index of Attitudes Toward Preventive Care					NS	NS	NS
0-1 Negative	16	17.9	8.0	11.9			
2	43	33.3	36.0	35.6			
3	36	23.1	36.0	30.5			
4 Positive	28	25.6	20.0	22.0			

Table 1 - continued

	Total N	Distribution (%) Nmet White	Met White	Met Nonwhite	Level of Significance for Comparisons: Met vs. Nmet All	Met vs. Nmet White Only	Met Only White vs. Nonwhite
ENABLING CONDITIONS							
Economic							
Poverty status					≤.05	NS	≤.001
< 125% of poverty level	86	56.4%	56.0%	84.8%			
≥ 125% of poverty level	34	43.6	44.0	10.2			
NA	3	-	-	5.0			
Health Insurance					≤.001	NS	≤.01
Private only	38	56.4	40.0	10.2			
Medicaid or both medicaid and private	76	33.3	48.0	86.4			
None	9	10.3	12.0	3.4			
Accessibility							
Place of service for Preventive care					≤.001	≤.001	NS
Private pediatrician	47	15.4	52.0	47.5			
Private general practitioner	22	43.6	4.0	6.8			
Pediatric clinic in hospital or medical ctr.	28	23.1	16.0	25.4			
Public health clinic	15	-	24.0	15.2			
No usual place	5	5.1	4.0	3.4			
No well care	6	12.8	-	1.7			
Travel Time					NS	NS	NS
≤ 15 minutes	57	38.5	52.0	49.2			
16-30	43	38.5	24.0	37.3			
31-60	12	5.1	20.0	8.5			
No usual place; no care	11	17.9	4.0	5.1			

[a] Based on comparison of groups using Chi-square analysis.

[b] Nmet = Nonmetropolitan

[c] Met = Metropolitan

as married, 8 percent separated or divorced, and only 5 percent single. This contrasts sharply with both the white and nonwhite Milwaukee mothers. Sixty-four percent of the white Milwaukee women reported themselves married, 8 percent divorced or separated, and 28 percent single; 25 percent of the nonwhite women said they were married, 14 percent separated or divorced, and 61 percent single. These differences are also reflected in the household composition. Only 5 percent of the nonmetropolitan mothers were living alone with their child or children, contrasted with 28 percent of the white and 39 percent of the nonwhite urban mothers. Extended families played a larger role in the nonwhite households, with 27 percent of the mothers living in this type of household compared with 12 percent of the white urban mothers and 15 percent of the white rural mothers. White households on the average were smaller than the nonwhite households, although the difference was not significant.

No differences in number of living children are statistically significant, although in a larger proportion of nonmetropolitan families the study infant was the only living child in the family (44 percent compared with 30 percent).

With respect to attitudes toward preventive care, all mothers in both residential areas were virtually indistinguishable. Relatively few in each group expressed negative views. Virtually the entire sample of mothers considers preventive medical care important both for themselves and their children.

Enabling conditions. For both poverty status and health insurance coverage, statistically significant differences occur between whites

and nonwhites that are also reflected in the metropolitan-nonmetropolitan difference. About 85 percent of the nonwhites and 55 percent of both the urban and rural whites are classified as having incomes near or below poverty level. In data not shown here, median family income is low for all mothers, but it is $2,000 less for nonwhite mothers than for the white mothers ($4,500 compared with $6,500).

The distribution of type of health insurance coverage is also quite different. Larger proportions of both groups of urban mothers (86 percent of nonwhites, and 48 percent of whites) are recipients of Medicaid compared with the nonmetropolitan group (33 percent), and, conversely, a majority of the nonmetropolitan mothers have only private insurance plans (56 percent) compared to 40 percent of the urban whites and 10 percent of the urban blacks.

In order to evaluate public assistance in relation to economic need, the proportion of the sample families receiving public assistance was calculated for two groups: those at or below poverty, and those above poverty. For the three types of aid examined--Food Stamps, AFDC, and Medicaid--a higher proportion of the metropolitan families in poverty were receiving aid compared with the nonmetropolitan families.[4] Medicaid benefits are of special interest to this analysis, since they cover preventive care. Using only families below poverty as the base, 89 percent of the mothers in the urban area report that they have Medicaid, compared with about 55 percent of the mothers below poverty in rural areas.

The type of service where well care is obtained differs significantly for the metropolitan and nonmetropolitan mothers. Almost half of both the white and nonwhite metropolitan mothers take their children to a private pediatrician. Another 40 percent take them to either a pediatric clinic in a hospital or medical center, or to a public health clinic. Only 5 percent say they have no usual place of service for preventive care or have received no well-child care. The nonmetropolitan mothers, on the other hand, take their children to general practitioners (44 percent), the pedatric clinic in a major medical center (23 percent), and a few to private pediatricians (15 percent). A relatively high proportion of rural mothers--18 percent--say they have no usual place of service or that their child has received no well care. The fact that no mention was made of public health clinics in the rural counties reflects the low health budgets in rural counties.[5]

Regarding travel time to health services, the groups differ little. This may reflect the fact that 85 percent of the nonmetropolitan group use a car to get to the doctor or clinic, compared with about 40 percent of the metropolitan group. About one-third of the metropolitan group uses the bus, and an additional 14 percent walk to the service. Thus, although more miles may need to be covered in rural areas, the type of transportation available hastens the journey and results in no significant differences in travel time. About 80 percent of all mothers reach their health care provider within 30 minutes.

Utilization of Preventive Services

Table 2 presents the proportion of children receiving the two types of preventive care used in this analysis: immunizations and well-child

Table 2. Proportion of Children Receiving Immunizations and Well Checkups [a]

		Total Group		Nonmetropolitan White		Metropolitan Total		Metropolitan White		Metropolitan Nonwhite	
		N	%	N	%	N	%	N	%	N	%
Immunization Record at 20 Months											
DPT											
None		11	8.9	5	12.8	6	7.1	2	8.0	4	6.8
One		8	6.5	2	5.1	6	7.1	1	4.0	5	8.5
Two		8	6.5	3	7.7	5	6.0	2	8.0	3	5.1
Three		65	52.8	15	38.5	50	59.5	13	52.0	37	62.7
Booster		31	25.2	14	35.9	17	20.2	7	28.0	10	17.0
Mean number of shots		2.79		2.79		2.79		2.88		2.75	
Polio											
None		11	8.9	5	12.8	6	7.1	2	8.0	4	6.8
One		9	7.3	3	7.7	6	7.1	1	4.0	5	8.5
Two		10	8.1	4	10.3	6	7.1	2	8.0	4	6.8
Three		64	52.0	15	38.5	49	58.3	13	52.0	36	61.0
Booster		29	23.6	12	30.8	17	20.2	7	28.0	10	17.0
Mean number of doses		2.74		2.67		2.77		2.88		2.73	
Rubella											
None		38	30.9	12	30.8	26	31.0	4	16.0	22	37.3
Yes		85	69.1	27	69.2	58	69.0	21	84.0	37	62.7
Mean Immunization Score		8.29		8.23		8.32		9.12		7.98	
Well Checkups by 3, 12, and 20 Months											
	Score										
Inadequate at 3 Interviews	0	11	8.9	4	10.3	7	8.3	1	4.0	6	10.2
Adequate at 1, Inadequate at 2	1	28	22.8	12	30.8	16	19.0	5	20.0	11	18.6
Adequate at 2, Inadequate at 1	2	12	9.8	5	12.8	7	8.3	1	4.0	6	10.2
Adequate at 3 Interviews	3	72	58.5	18	46.2	54	64.3	18	72.0	36	61.0
Mean Checkup Score		2.18		1.95		2.29		2.44		2.22	
						P <.10					

[a] None of the comparisons made (metropolitan-nonmetropolitan; metropolitan white-nonwhite; white metropolitan-nonmetropolitan distributions) were significantly different, using the Chi-square test, except for the difference between the white metropolitan-nonmetropolitan Mean Checkup Score.

checkups, by race and residential location of mother.

Immunizations. At each interview mothers were asked whether the study child had been immunized for DPT, polio, and rubella (German measles). At the third and last interview, when the infant was approximately 20 months old, the nurse filled in a summary health appraisal sheet, using any health records she may have had in addition to the mother's reports. As mentioned before, standards suggested by the Center for Disease Control (1972, 1977) were used. Using a conservative evaluation to determine satisfactory immunization (a minimum of three DPT shots or three polio doses) we note that for DPT, 80 percent of the metropolitan children and 74 percent of the nonmetropolitan children were satisfactorily immunized. In the polio vaccine records, the proportion adequately immunized at 20 months is 79 and 69 percent respectively. For the one rubella shot, just under 70 percent of the children were immunized in both groups. None of the race/residence groups differ statistically from each other.

An immunization score was constructed based on the three components.[6] It ranged from 0 to 12, with a grand mean value of 8.29. As can be seen in Table 2, children of the white metropolitan mothers have the highest scores (9.12), followed by the white nonmetropolitan children (8.23), with the children of nonwhite mothers having the lowest scores (7.98). However, the differences are not statistically significant.

Well-child checkups. Using the standards of the American Academy of Pediatrics the child's record was evaluated three

times during the 20-month life span. The second panel of Table 2 shows that only 10 percent of both the metropolitan and nonmetropolitan group reported inadequate care at all three interviews. However, both black and white metropolitan children fared better than the white nonmetropolitan children. Seventy-two percent of the white metropolitan children and 61 percent of the nonwhite children, but only 46 percent of the white nonmetropolitan children had adequate numbers of well-child checkups at each of the three interviews. This difference is also reflected in the mean checkup scores of the two groups. Thus, in checkups, there is little difference between the white and nonwhite metropolitan groups; however, a substantial difference is noted between the white metropolitan and nonmetropolitan groups.

Relationship of Predisposing and Enabling Conditions to Preventive Medical Care

The mean values of both dependent variables were calculated for every category within every independent variable using Multiple Classification Analysis. Table 3 presents the findings of both the immunization and checkup scores.

Only three variables are significantly related to immunization scores: education of mother, poverty status, and place of service for preventive care. In each of these variables, the hypotheses are supported. That is, higher immunization scores are achieved by mothers who have higher educational levels, who are above poverty level, and who go to private pediatricians. Those who profess no usual place of medical

Table 3. Mean Immunization and Checkup Scores for Predisposing and Enabling Conditions

	Immunization Score (Range 0-12) Grand Mean = 8.29	Checkup Score (Range 0-3) Grand Mean = 2.18
PREDISPOSING CONDITIONS		
Demographic		
Age		
14-19	7.5	2.3 **
20-24	8.5	2.4 ***
25-29	9.1	2.0
30-46	7.9	1.5
R	.147	.315**
Education		
< High school graduate	7.5 **	2.0 +
High school graduate	9.1	2.4
> High school graduate	10.9	2.6
R	.304**	.190
Marital Status		
Married	8.7	2.0
Separated, divorced	7.1	2.3
Single	8.0	2.3
R	.146	.132
Household Composition		
Mother, children	8.2	2.3
Mother, male partner, children	8.6	2.1
Mother, children, extended family	7.7	2.4
Mother, male partner, children, extended family	6.8	1.7
R	.126	.161
Number of Children		
1	9.2	2.5 **
2	7.8	2.2 *
3	7.8	2.3 *
4-11	7.9	1.7
R	.174	.286*
Beliefs		
Index of Attitudes toward Preventive Care		
0-1 Negative	8.0	1.9
2	7.7	2.0
3	8.9	2.3
4 Positive	8.6	2.4
R	.139	.182

Table 3 - continued

	Immunization Score	Checkup Score
ENABLING CONDITIONS		
Economic		
Poverty Status		
< 125%	7.9 *	2.1
≥ 125%	9.5	2.4
NA	--	--
R	.216+	.140
Health Insurance		
Private only	8.8	2.2
Medicaid or both medicaid and private	7.9	2.1
None	10.0	2.3
R	.170	.061
Accessibility		
Place of Service for Preventive Care		
Private pediatrician	8.9	2.7
Private general practitioner	8.4	2.1 *
Pediatric clinic in hospital or medical center; public health clinic	8.3	2.0 ***
No usual place	5.8 +	1.2 **
No well care	5.7 *	1.0 ***
R	.228	.433***
Travel Time		
≤ 15 minutes	8.6 *	2.4 ***
16-30	8.6	2.1
31-60	8.1	2.6
No usual place; no care	5.7	1.1
R	.220	.347**

+ ≤ .10.
* ≤ .05.
** ≤ .01.
*** ≤ .001.

service or no well-baby care have the lowest scores.[7] This confirms the often noted finding that less care is obtained by respondents who do not name a specific place or individual when asked where they get care (Wan and Gray, 1978).

For adequacy of checkups, four independent variables are significantly related: mother's age and educational level completed, number of living children, and place where care was received. Better checkup scores are achieved by younger mothers, those with higher educational levels, fewer numbers of living children, and, once again, mothers who go to private pediatricians.

The remaining independent variables show no statistically significant relationship with either of the dependent variables, and are excluded from the rest of the analysis.

One final set remains: to examine regression models for each race/residence group separately, and compare the gross scores with the scores net of the effects of the independent variables shown to have a significant effect. Table 4 displays these scores for the three residence/race groups. By comparing the gross and net values of the models, we are able to evaluate the effects of each set of controls.

Examining the gross immunization scores first, we see, as demonstrated in Table 2, that the scores are ranked with white metropolitan highest, white nonmetropolitan next, and nonwhite metropolitan lowest. The latter two positions are reversed if we remove the effect of mother's

Table 4. Multiple Classification Analysis of Immunization and Checkup Scores for Residence/Race Groups

	N	Immunization Score Grand Mean = 8.29				Checkup Score Grand Mean = 2.18				
		Gross	Net[a]	Net[b]	Net[c]	Gross	Net[d]	Net[e]	Net[f]	Net[g]
Nonmetropolitan										
White	39	8.2	7.9	7.8	8.2	1.9	2.0	1.9	1.9	2.1
Metropolitan						+				
White	25	9.1	8.9	8.6	8.4	2.4	2.4	2.4	2.3	2.3
Nonwhite	59	8.0	8.3	8.5	8.3	2.2	2.2	2.3	2.3	2.2
R^2		.014	.100	.119	.157	.028	.114	.140	.185	.292
p for model		NS	.01	.02	.03	NS	.01	.02	.01	<.001

[a] Net of education.

[b] Net of education and poverty status.

[c] Net of education, poverty status, and place of service.

[d] Net of age.

[e] Net of age and number of children.

[f] Net of age, number of children, and education.

[g] Net of age, number of children, education, and place of service.

+ $\leq .10$.

education and poverty status. But if we remove the effect of place of service (Net^c), we see that the range of values is substantially reduced. These figures suggest that if mother's educational level, poverty status, and availability of different types of medical providers were more evenly distributed between metropolitan and nonmetropolitan areas, the differences in immunization scores would also be reduced. They also indicate that it is not race as such, but rather education and poverty status that accounts for much of the difference in scores between urban blacks and whites. According to Table 4 this latter model explains 15.7 percent of the variance in immunization scores.

The variation in checkup scores between race/residence groups appears to be explained in a different manner. The ranking of the gross relationships indicates that infants of metropolitan mothers have better scores than those of nonmetropolitan mothers. Adding age and number of children to the model has little effect on the scores. However, differences among groups are reduced by adding mother's education and place of care to the model, thus indicating that much of the difference in checkup scores between metropolitan and nonmetropolitan children can be attributed to mother's education and type of place preventive care is obtained. The explanatory power of the latter model reaches 29.2 percent.

7. SUMMARY

Two measures of preventive care for children (immunization record for DPT, polio, and rubella, and record of physical checkups in

the absence of illness or symptoms) were analyzed for three groups of low-income mothers: white and nonwhite mothers who lived in a metropolitan area, and white mothers who lived in nonmetropolitan areas in Wisconsin. Information was obtained by home interviews with the mothers when the infants were approximately 3, 12, and 20 months old. The gross immunization scores were best for urban white children, followed by rural white children, and worst for urban black children. For preventive checkups, however, both the urban white and black children had better scores than the rural white children.

Other variables, considered "predisposing" and "enabling" conditions by Andersen and Aday (1978), were then entered as controls into the models generating the mean scores. When this was done, most of the differences in immunization scores could be explained by mother's educational level, poverty status, and type of medical service used for preventive care. For well-checkup scores, differences were largely explained by age of mother, number of living children, mother's education, and type of place for well care.

8. DISCUSSION

Immunizations for very young children are considered essential in a plan of well-child care. The consistently lower proportion of such immunizations in rural areas is of concern to public health personnel nationally. The analyses performed here suggest that these immunization levels in rural areas will improve when educational levels of mothers improve, and when the accessibility to immunization improves--not by travel

time or type of transportation, but by residents being able to identify a source of regular care. Patients of pediatricians have the best records of immunizations, followed by patients of general practitioners, and then by those who go to pediatric clinics in hospitals or medical centers, or to public health clinics. This study confirms previous findings that when respondents do not name a specific site for medical care, they are less likely to obtain care.

Records of regular checkups for infants appear to be less affected by socioeconomic constraints, such as poverty or health insurance, than by demographic life cycle factors. Mothers who are older and have four or more children are significantly less likely to have taken their youngest child for well checkups. These findings corroborate some previous work that relates less preventive care to parity position of the child (Morris et al., 1966; NCHS, 1969; Slesinger, 1973). It is not possible with present data to tell why this is the case. We can speculate that these mothers are more experienced and rely on their own judgment to evaluate the child's wellness, or it may be that they are so busy with parenting responsibilities for the other children that they slight well-checkups for the youngest. For checkups as well as immunizations, place of well care made a significant difference in the amount of preventive care received. Again, children who saw pediatricians had the best well checkup scores, followed by those who went to a general practitioner or pediatric clinic.

It is wise, in closing, to summarize some of the variables that were <u>not</u> related to obtaining preventive care: marital status and household composition, attitudes toward preventive care (virtually everyone

expresses positive attitudes); type of health insurance (once poverty status is taken into account), and travel time and type of transportation used to get to the doctor.

Although national statistics will probably continue to show rural-urban differences in preventive medical utilization for children, we have seen that these differences can be explained by demographic characteristics of the mother which predispose her to get care, such as her educational level, age, and number of children. In addition, the type of medical provider, an enabling condition, affects the level of preventive care obtained. In areas under study here, it was noted that public health endeavors are by and large at a severe economic disadvantage in rural areas for basic maternal and child health services. Perhaps one of the most important implications of the findings, especially in rural areas, is the importance of continuing efforts to involve mothers of newborns in a network of preventive services so that they will be able to establish ties with a place for regular care.

NOTES

[1]This study was funded by the Institute for Research on Poverty, the Research Committee of the Graduate School, and the College of Agricultural and Life Sciences, University of Wisconsin-Madison. The author wishes to express her appreciation to the 22 public health nurses who were involved in the study for 2 years, and to the mothers who welcomed them into their homes. The assistance of Eleanor Cautley at all stages of the project is also greatly appreciated.

[2]The following four items from the interview schedule were used to address mother's orientation toward preventive care: "As long as you feel all right, there is no reason to go to a doctor"; "I would rather not go to a doctor unless I have to"; "Even if a person is not sick, he should see a doctor at least once a year for a routine checkup"; "Do you think it is very important, somewhat important or not important to take young children to a doctor for regular checkups even when they are feeling well?" Each answer which supported preventive care was given a score of 1, although for the children's checkup score only "very" important was given a score of 1; otherwise, answers were scored 0.

[3]For ease of presentation, mothers living in Milwaukee will hereafter be called urban or metropolitan mothers, interchangeably, and mothers living in the nonmetropolitan counties will also be called rural mothers. However, 12 mothers in the latter group actually lived in cities of 2,500 or more.

[4]Statistics to corroborate such findings are unavailable from the Wisconsin Department of Health and Social Services. However, rural

nurses who conducted the interviews often commented that they interviewed mothers who were eligible for public assistance, but who refused to apply in small towns because of the stigma attached and the lack of confidentiality in handling cases.

[5]The distribution of the medical delivery systems the women use for well care requires some comment. Although the figures are not surprising to readers who are familiar with the services available in rural areas (primarily general practitioners), it is noteworthy that none of these rural women mentioned a public health immunization clinic, even though public health nurses were conducting the interviews. There is a simple reason for this. County Health Departments included in this study were modestly funded and supported by their County Health Boards. Financial resources and nurses' time were allocated to federally mandated programs. This included the categorical aid programs, such as aid to the blind, mentally retarded, and disabled; required school health programs; an attempt at Early Periodic Screening and Diagnostic Testing (EPSDT); and occasional involvement in special programs of the moment (aid to elderly shut-ins, diabetics, teen pregnancy classes, etc.). There were very limited, if any, monies allocated to an ongoing program of maternal and child health which might include standard well-child checkups or immunizations. This was not true of the city of Milwaukee, however, where the Department of Health's Bureau of Nursing has had a long tradition of staffing well-baby clinics, immunization programs, and routine neonatal visits to the home of every mother residing in the city who gives birth.

[6]DPT and polio were each scored 0 to 4, depending on number of shots or doses in the 20-month period. For rubella, having the shot = 4, and not having it = 0.

[7]The question about immunizations and well checkups was not contiguous to the question about place of medical service in the interview. The first set of items was asked early in the interview, along with other questions about the child's health and medical care. Later in the interview the mother was asked where she takes her child when he or she is sick, and where she takes her child for well care. Therefore there is no clear correspondence between the sets of items.

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