Rural Maternal, Child, and Adolescent Health

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This article summarizes the most current national information on rural maternal, child, and adolescent[1] health. Our purpose is to present a state-of-the-art overview of rural demographics and fertility, health status, health services utilization, and health care financing from which future research recommendations can be developed.

The literature base on rural maternal and child health services is very limited, with the exception of rural perinatal care. Moreover, the literature—often five to ten years out-of-date—focuses on the organization and delivery of services in the mid-to-late 1970s, a period of extensive federal involvement in rural health. The literature by rural minority status is even more sparse, with the exception of low birthweight and infant mortality information.

Consequently, this report is primarily an analysis of the health differentials among children in nonmetropolitan and metropolitan areas[2] based on several national data bases of the National Center for Health Statistics. The principal data source used was the National Health Interview Survey (NHIS). The NHIS collects information each year on health status and health care use based on a nationally representative survey of approximately 40,000 households in metro and nonmetro areas of the United States (Moss and Parsons 1986). Additional national data sources from the National Center for Health Statis-

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tics analyzed here include the 1983 vital and health statistics on mortality (NCHS 1987), the 1985 National Ambulatory Medical Care Survey (1987), and the 1980 National Natality Survey (Kleinman et al. 1983; Singh et al. 1985).

Data from most national health surveys can be broken into only very gross dichotomies, such as metro and nonmetro counties. These gross statistical distinctions can mask the tremendous diversity found both inside and outside metropolitan areas. For example, many metropolitan statistical areas (MSAs) are composed of multiple counties surrounding an urban core city. Within these county groups, population density can range from farmland to urban tenement. Similarly, nonmetro counties vary greatly in their population density, from those with moderate-sized towns and cities to those that are virtually uninhabited.

Despite the limitations of the metro and nonmetro dichotomy, even such gross information is generally unavailable in published format from the National Center for Health Statistics (NCHS) unless national statistical agency personnel are willing to run special tabulations for children in metro/nonmetro areas. Moreover, much of the published information from NCHS is not broken down into useful child age groupings (e.g., under 21 or under 15).

DEMOGRAPHICS AND FERTILITY

DEMOGRAPHICS

Twenty-one million children and youth under 21 reside in nonmetro areas of the United States (Table 1). They represent 33 percent of the total nonmetro population. Among all children and youth, 29 percent live in nonmetro areas. The age, sex, and family size distribution, however, are similar among children and youth in metro and nonmetro areas.

Demographic differences between metro and nonmetro children are found in race, family structure, poverty status, and region of residence. First, proportionately fewer minorities reside in nonmetro areas than in metro areas. Table 1 shows that nonwhites comprise only 18 percent of children in nonmetro areas as compared to 32 percent in metro areas. In nonmetro areas, 11 percent of the children are black, non-Hispanic; 5 percent are Hispanic; and 2 percent are Asian and other non-Hispanic. Although proportionately they comprise a smaller group in nonmetro areas, significant numbers of minorities are present

Table 1: Sociodemographic Characteristics of Children and Youth under Age 21, Residing in Metropolitan and Nonmetropolitan Areas, United States, 1984–1985

Characteristic	*Percent Distribution per Place of Residence*		*Population (in 1,000s) per Place of Residence*	
	Metro Areas	*Nonmetro Areas*	*Metro Areas*	*Nonmetro Areas*
Age				
Under 6 years	29.1%	28.9%	15,318	6,157
6 to 11 years	26.0	26.8	13,674	5,708
12 to 20 years	44.9	44.3	23,672	9,451
Sex				
Male	50.8	50.8	26,701	10,824
Female	49.2	49.2	25,904	10,492
Race				
White not Hispanic	67.9	82.1	35,767	17,509
Black not Hispanic	16.3	10.6	8,588	2,256
Asian and other not Hispanic	2.9	2.0	1,542	421
Hispanic	12.9	5.3	6,768	1,129
Family size				
Four or fewer	60.3	59.1	31,738	12,607
Five or more	39.7	40.9	20,926	8,710
*Family structure**				
Both parents present	72.3	76.2	37,737	16,118
One or both parents absent	27.7	23.8	14,484	5,026
Poverty status†				
Above poverty	80.7	74.1	37,633	14,295
Below poverty	19.3	25.9	9,020	4,983
Region				
Northeast	23.8	12.0	12,513	2,562
Midwest	25.1	27.8	13,242	5,918
South	29.8	45.8	15,702	9,759
West	21.3	14.4	9,759	3,078

Source: Microdata from the 1984 and 1985 National Health Interview Survey.

*Excludes unknown family structure.

†Excludes unknown income.

in nonmetro areas. Over 1 million Hispanic and 2 million black children reside in nonmetro areas of the United States.

Second, children in nonmetro areas are more likely to have both parents present than children in metro areas. Third, they are more likely to be poor; 26 percent of children in nonmetro areas are poor in contrast to 19 percent of children in metro areas. Finally, the region with by far the greatest number of children residing in nonmetro areas is the South, where 46 percent of all nonmetro children live. Another 28 percent of nonmetro children live in the Midwest; 14 percent are from the West; 12 percent come from the Northeast.

In summary, children and youth under 21 represent 33 percent of the total nonmetro population. Almost 20 percent of all nonmetro children are minorities. More than one out of four nonmetro children live in poverty, and almost half of all nonmetro children reside in the South.

FERTILITY

In 1983, almost 4 million infants were born in the United States. Approximately one-quarter of these births occurred in nonmetro counties. An examination of the proportion of births to women of all ages highlights some small but important differences in the distribution of age of mother and race of infant in metro and nonmetro areas. Table 2, for example, shows that 16 percent of all nonmetro live births were to adolescents compared to 12 percent of all metro births. Among the 136,047 births to adolescent nonmetro mothers, 75 percent of the infants were white and 21 percent were black. In metro areas, 343,600 teenagers gave birth; 65 percent were white and 33 percent black.

HEALTH STATUS

Measuring the overall health status of children presents many challenges to health services researchers. Traditionally, mortality and selected measures of morbidity, designed for measuring the health status of adults or, at best, the overall population, have been used as indicators of child health status. In recent years, however, use of such limited measures has come under criticism by researchers in the child health field. Research now underway suggests that several additional areas must be considered to assess child health status adequately. In addition to mortality, Starfield describes the following domains for measuring children's health (Starfield 1974, 1987):

Table 2: Live Births by Age of Mother and Race by Metropolitan and Nonmetropolitan Counties, 1983

Area and Race	*Total (%)**	*<15 Years (%)*	*15-19 Years (%)*	*20-29 Years (%)*	*30-39 Years (%)*	*40+ Years (%)*
All counties						
All races	3,669,141	9,965	469,682	2,307,287	854,251	27,957
	(100.0)	(0.3)	(12.8)	(62.9)	(23.3)	(0.8)
White	2,923,502	3,959	320,953	1,867,980	708,841	21,767
	(100.0)	(0.1)	(11.0)	(63.9)	(24.2)	(0.7)
Black	592,745	5,720	134,392	350,673	97,886	4,074
	(100.0)	(1.0)	(22.7)	(59.2)	(16.5)	(0.7)
Metro counties						
All races	2,791,896	7,536	336,064	1,738,107	688,171	22,018
	(100.0)	(0.3)	(12.0)	(62.3)	(24.6)	(0.8)
White	2,182,867	2,909	219,781	1,379,062	564,190	16,925
	(100.0)	(0.1)	(10.1)	(63.2)	(25.8)	(0.8)
Black	489,145	4,441	107,610	290,506	83,285	3,303
	(100.0)	(0.9)	(22.0)	(59.4)	(17.0)	(0.7)
Nonmetro counties						
All races	877,245	2,429	133,618	569,182	166,080	5,936
	(100.0)	(0.3)	(15.2)	(64.9)	(18.9)	(0.7)
White	740,635	1,050	101,172	488,918	144,651	4,844
	(100.0)	(0.1)	(13.7)	(66.0)	(19.5)	(0.6)
Black	103,600	1,279	26,782	60,167	14,601	771
	(100.0)	(0.1)	(25.9)	(58.1)	(14.1)	(0.7)

Source: Unpublished tabulations from *Vital and Health Statistics*, National Center for Health Statistics, Washington, DC.

*Due to rounding of figures, percentages added may not total 100.0.

1. *Disorder*—including the number of types of physical and behavioral illnesses and problems experienced during a set time period
2. *Activity*—including measures of functional status, such as limitation of activity, bed disability, school absences, restricted activity, sickness impact, and activities of daily living
3. *Comfort*—including physical and mental states of feeling such as bodily symptoms and signs and emotional states
4. *Resilience*—including states or behaviors that increase or reduce the risk of illness

5. *Satisfaction*—including self-perceptions of well-being and attitudes toward health, and
6. *Achievement*—including development and social competence.

Because of the limited existing data and research results on rural child health and rural subpopulations, the following presentation focuses primarily on child health status measures associated with mortality, disorders, activity and, to a lesser extent, with satisfaction and resilience among metro and nonmetro children. Far more analysis is needed of all the measures described for all rural children, and for southern black, Hispanic, Native American, Appalachian white, other poor white, and Eskimo children, in particular.

MORTALITY

According to the National Center for Health Statistics (NCHS 1987), almost 100,000 infants, children, adolescents, and young adults under 25 died in 1983—about 5 percent of all deaths in the United States. Table 3 shows that over one-quarter of these deaths occurred among children and youth from nonmetro areas. The groups at highest risk of mortality in both metro and nonmetro areas are infants under a year old and adolescents and young adults ages 15–24.

The following section reviews 1983 vital and health statistics mortality data by child age group and race. Unfortunately, published mortality information is available only for selected age groups, and no published age-specific information on cause of death is available for deaths in nonmetro areas.

The mortality age distribution among the under-25 population is roughly similar among metro and nonmetro populations, except for the under-1 population (see Table 3). In metro areas infant deaths account for 43 percent of all deaths (among the under-25 population) but only for 39 percent of all deaths in nonmetro areas. This is due in large part to the differences in racial composition and reduced risk of infant mortality in rural areas.

In general, the infant and neonatal mortality rates in nonmetro areas are similar to metro area rates, as shown in Table 4. The fetal death rate among nonmetro blacks is higher than among blacks in metro areas. Large racial differences in infant mortality rates are apparent in both nonmetro and metro areas. The overall infant mortality rate for the United States was 11.2 per 1,000 live births in 1983. The black metro infant mortality rates was 19.1 compared to the white metro rate of 9.6. Similarly, the nonmetro black infant mortality rate was 19.7 compared to 10.0 for nonmetro whites—a twofold difference in both instances.

Table 3: Deaths among Persons under Age 25, by Race for Metropolitan and Nonmetropolitan Counties, 1983

Area and Race	*Total under 25 Years (%)**	*Under 1 Year (%)*	*1-4 Years (%)*	*5-14 Years (%)*	*15-24 Years (%)*
United States	96,653	40,627	7,801	9,143	39,082
	(100.0)	(42.0)	(8.1)	(9.5)	(40.4)
Metro counties	71,077	30,651	5,545	6,494	28,387
	(100.0)	(43.1)	(7.8)	(9.1)	(40.0)
Nonmetro counties	25,576	9,976	2,256	2,649	10,695
	(100.0)	(39.0)	(8.8)	(10.4)	(41.8)
U.S. white	72,712	28,301	5,767	7,091	31,553
	(100.0)	(38.9)	(7.9)	(9.8)	(43.4)
Metro counties	52,070	20,754	3,974	4,908	22,434
	(100.0)	(39.9)	(7.6)	(9.4)	(43.1)
Nonmetro counties	20,642	7,547	1,793	2,183	9,119
	(100.0)	(36.6)	(8.7)	(10.6)	(44.2)
U.S. all other	23,943	12,328	2,034	2,052	7,529
	(100.0)	(51.7)	(8.5)	(8.6)	(31.4)
Metro counties	19,004	9,897	1,571	1,583	5,953
	(100.0)	(52.1)	(8.3)	(8.3)	(31.3)
Nonmetro counties	4,933	2,429	463	465	1,576
	(100.0)	(49.2)	(9.4)	(9.4)	(31.9)
U.S. black†	21,349	11,242	1,794	1,784	6,529
	(100.0)	(52.7)	(8.4)	(8.4)	(30.6)
Metro counties	17,405	9,175	1,426	1,405	5,399
	(100.0)	(52.7)	(8.2)	(8.1)	(31.0)
Nonmetro counties	3,944	2,067	368	379	1,130
	(100.0)	(52.4)	(9.3)	(9.6)	(29.7)

Source: National Center for Health Statistics. *Vital Statistics of the United States, 1983, Vol. 11, Mortality, Part B.* DHHS Pub. No. (PHS) 87-1102. Public Health Service, Washington, DC: GPO, 1987.

*Due to rounding of figures, percentages added may not total 100.0.

†Black is a subset of all other races.

Neonatal deaths (deaths during the first 28 days of life) accounted for nearly two-thirds of all infant deaths. The neonatal death rate for nonmetro blacks was almost double that for whites (11.8 per 1,000 and 6.3 per 1,000, respectively). A similar differential was found among metro black and white neonates.

The mortality rate among black infants in utero (fetal deaths) is almost 25 percent higher in nonmetro areas, however, than it is in

Table 4: Total Deaths, Infant, Fetal and Neonatal Deaths, and Rates, by Race, for Metropolitan and Nonmetropolitan Counties, 1983

Deaths	*United States*	*Metro*	*Nonmetro*
Total deaths	2,019,201	1,484,770	554,431
(Percent distribution)	(100.0)	(100.0)	(100.0)
White	1,765,582	1,267,250	498,332
	(87.4)	(85.3)	(89.9)
All other	253,619	197,520	58,099
	(12.6)	(13.3)	(10.5)
Black	233,124	183,024	50,100
	(11.5)	(12.3)	(9.0)
Under age 1 year			
Total	40,627/11.2	30,651/11.1	9,976/11.2
	(100.0)	(100.0)	(100.0)
White	28,301/9.7	20,754/9.6	7,547/10.0
	(69.7)	(67.7)	(75.7)
All other	12,326/16.8	9,897/16.6	2,429/17.6
	(30.3)	(32.3)	(24.3)
Black	11,242/19.2	9,175/19.1	2,067/19.7
	(27.7)	(29.9)	(20.7)
Fetal deaths			
Total	30,752/8.5	22,715/8.3	8,037/9.0
	(100.0)	(100.0)	(100.0)
White	21,650/7.5	15,614/7.3	6,037/8.0
	(70.4)	(68.7)	(75.1)
All other	9,102/12.4	7,101/11.9	2,001/14.5
	(29.6)	(31.3)	(24.9)
Black	6,001/13.7	6,293/13.1	1,703/16.3
	(19.5)	(27.7)	(21.2)
Under age 28 days			
Total	26,507/7.3	20,290/7.4	6,217/7.0
	(100.0)	(100.0)	(100.0)
White	18,603/6.4	13,814/6.4	4,789/6.4
	(70.2)	(68.1)	(77.0)
All other	7,904/10.8	6,476/10.9	1,428/10.4
	(29.8)	(31.9)	(23.0)
Black	7,277/12.4	6,038/12.5	1,239/11.8
	(27.5)	(15.0)	(19.9)

Source: National Center for Health Statistics. *Vital Statistics of the United States, 1983, Vol. 11, Mortality, Part B.* DHHS Pub. No. (PHS) 87-1102. Public Health Service, Washington, DC: GPO, 1987.

*Due to rounding of figures, percentages added may not total 100.

metro areas (see Table 4). To what extent this difference in fetal mortality rates is due to characteristics other than place of residence requires further investigation.

DISORDERS

Physical and mental disorders can be classified as either acute or chronic in duration. Data from the 1984–1985 National Health Interview Survey (NHIS) on the incidence of acute conditions and the prevalence of chronic conditions are presented in Tables 5 and 6.

Acute Conditions

As defined by NHIS, acute conditions are those that were first noticed less than three months before the interview and were severe enough to have some effect on a person's behavior. To be considered acute, the condition must have caused the person to cut down on his or her activities for at least half a day or resulted in physician contact. Incidence of acute conditions according to type of condition in metro and nonmetro areas is illustrated in Table 5.

For 1984 and 1985, the annual incidence rate of 246 acute conditions per 100 persons under 21 years in nonmetro areas was slightly lower than the incidence rate in metro areas (260 per 100). Respiratory conditions, especially colds and influenza, accounted for slightly over half of all acute conditions in both metro and nonmetro areas. For children and youth in nonmetro areas, the incidence of acute conditions in broad categories were ranked: respiratory conditions, infective and parasitic diseases, injuries, and digestive conditions.

Chronic Conditions

The NHIS defines a chronic condition as one that was first noticed more than three months prior to the interview date or one of several specified conditions, such as asthma or diabetes, that are considered chronic regardless of the date of onset. Prevalence of chronic conditions for metro and nonmetro children and youth is shown in Table 6. Although some variation is present (e.g., visual impairments and gastric ulcers), prevalence of most chronic conditions is similar for metro and nonmetro children and youth. As a group, respiratory conditions were the most commonly reported conditions during 1984–1985 for nonmetro children. The leading respiratory conditions in terms of prevalence included chronic sinusitis, hay fever, and bronchitis. Other frequently reported chronic conditions among nonmetro children and

Table 5: Acute Conditions per 100 Persons under Age 21, United States, 1984–1985

Type of Acute Condition	*Number of Acute Conditions per 100 Persons per Year*	
	Metro	*Nonmetro*
All acute conditions	260.2	245.9
Infective and parasitic diseases	36.7	37.3
Common childhood diseases	5.1	4.3
Intestinal virus, unspecified	6.3	5.9
Viral infections, unspecified	12.5	14.7
Other	12.7	12.3
Respiratory conditions	131.4	124.9
Common cold	48.3	42.3
Other acute upper respiratory infections	18.9	16.1
Influenza	55.8	56.2
Acute bronchitis	4.0	4.1
Pneumonia	1.1	2.5
Other respiratory conditions	3.4	3.6
Digestive system conditions	10.3	9.7
Dental conditions	2.4	2.4
Indigestion, nausea, and vomiting	7.0	5.9
Other digestive conditions	1.0	1.4
Injuries	33.3	31.3
Fractures and dislocations	3.8	4.6
Sprains and strains	5.3	5.4
Open wounds and lacerations	9.2	8.0
Contusions and superficial injuries	8.3	7.0
Other current injuries	6.7	6.6
Selected other acute conditions	48.5	42.5
Eye conditions	1.9	1.8
Acute ear infections	19.0	15.9
Other ear conditions	2.8	2.6
Acute urinary conditions	1.2	1.9
Disorders of menstruation	0.8	0.7
Other disorders of female genital tract	0.4	0.6
Delivery and other conditions of pregnancy and puerperium	1.0	1.7
Skin conditions	3.3	2.2
Acute musculoskeletal conditions	1.5	1.9
Headache, excluding migraine	2.6	1.9
Fever, unspecified	5.0	3.6
All other acute conditions	9.0	7.6

Source: Microdata from the 1984–1985 National Health Interview Survey.

Table 6: Selected Reported Chronic Conditions per 100 Persons under Age 21, United States, 1984–1985

Type of Chronic Condition	*Number of Chronic Conditions per 1,000 Persons per Year*	
	Metro	*Nonmetro*
Selected skin and musculoskeletal conditions		
Arthritis	3.9	5.4
Disorders of bone or cartilage	1.6	1.9
Sebaceous skin cyst	3.1	2.9
Acne	31.0	35.4
Psoriasis	2.5	2.7
Dermatitis	42.7	37.2
Dry (itching) skin, NEC*	8.7	8.4
Ingrown nails	8.4	9.9
Corns and calluses	2.4	1.2
Impairments		
Visual impairment	10.2	15.0
Hearing impairment	20.7	26.2
Speech impairment	13.7	16.6
Mental retardation	8.6	10.0
Absence other	1.0	2.5
Deformity or orthopedic impairment		
Back	21.0	15.4
Upper extremities	2.7	3.0
Lower extremities	24.3	29.5
Color blindness	3.1	5.9
Tinnitus	1.5	1.2
Cataracts	1.3	1.6
Selected digestive conditions		
Gastric ulcer	1.7	5.2
Hernia of abdominal cavity	3.8	3.3
Gastritis and duodenitis	2.4	5.1
Indigestion	3.1	3.4
Enteritis and colitis	4.3	5.4
Constipation	5.5	6.7
Other stomach and intestinal disorders	5.0	2.5
Selected conditions of the genitourinary, nervous, endocrine, metabolic, and blood and blood forming systems		
Other disorders of the thyroid	1.0	1.6
Diabetes	1.7	2.8
Anemias	10.9	12.7
Epilepsy	4.6	9.3
Migraine headache	17.0	14.7
Other headache (excludes tension headache)	14.1	13.6

Continued

Table 6: Continued

Type of Chronic Condition	Number of Chronic Conditions per 1,000 Persons per Year	
	Metro	Nonmetro
Kidney infections	1.3	9.0
Bladder infections	2.3	3.1
Other disorders of bladder	1.9	2.3
Noninflammatory disease of female genital organs	1.1	1.1
Menstrual disorders	4.4	5.2
Other disorders of female genital organs	5.5	8.1
Selected circulatory conditions		
Heart rhythm disorders	18.8	19.0
Congenital heart disease	3.1	1.1
Other selected diseases of heart (excludes hypertension)	1.9	1.1
High blood pressure (hypertension)	4.3	5.4
Varicose veins of lower extremities	1.0	2.2
Hemorrhoids	2.5	1.1
Selected respiratory conditions		
Chronic bronchitis	50.1	52.5
Asthma	48.2	34.2
Hay fever/allergic rhinitis without asthma	64.2	53.8
Nasal polyps	2.0	2.0
Chronic sinusitis	62.6	71.1
Deviated nasal septum	1.7	1.6
Chronic disease of tonsils and adenoids	27.6	30.8
Chronic laryngitis	3.6	3.2
Other diseases of lung	3.0	4.3

Source: Microdata from the 1984–1985 National Health Interview Survey.

*Not elsewhere classified.

youth included: deformities and orthopedic impairments, dermatitis, acne, and hearing impairments.

ACTIVITY

Two measures of the effect of acute and chronic illnesses on children's activity levels, bed days and limitation of activity, are illustrated in Table 7. Limitation of activity is a measure of disability resulting from chronic conditions. During 1984 and 1985, only about 5 percent of all U.S. children and youth under 21 years of age were reported to be limited in their usual activities by chronic conditions. Prevalence of limitation of activity differs little by residential status. Even though the

Table 7: Health Characteristics of Children and Youth under Age 21, Residing in Metropolitan and Nonmetropolitan Areas, United States, 1984–1985

	Place of Residence			
	*Metro Areas**	*Nonmetro Areas†*		
	Total	*Total*	*Below Poverty Level*	*Above Poverty Level*
Limitation of activity				
Limited in major activity	3.8%	3.3%	4.5%	3.1%
Limited in other activities	1.4	1.6	1.9	1.6
Not limited	94.8	95.1	93.6	95.3
Bed days				
Average annual number days spent ill in bed	4.2	3.7	4.0	3.5

Source: Microdata from the 1984 and 1985 National Health Interview Survey.

*Persons residing in metropolitan statistical areas.

†Persons not residing in metropolitan statistical areas.

percentage of nonmetro children and youth with activity limitation is small, however, their numbers are significant: 705,000 children and youth were estimated to be limited in the amount or kind of their major activity (play for preschool children, school for those of school age, and work for older youth no longer in school). An additional 346,000 children and youth were reported to be limited in other activities, such as after-school sports, due to chronic illness in 1984–1985. In total, over 1 million children and youth residing in nonmetro areas faced some level of disability due to chronic illness.

The second measure of activity restriction presented in Table 7 is the average annual number of days spent ill in bed. These illness days reflect the effect of both acute and chronic conditions. It is apparent that nonmetro children experience somewhat fewer days ill in bed than metro children, although the difference is minor. While the average child living in a nonmetro area spends less than four days ill in bed annually, a total of 78 million days are lost to illness for the nonmetro population under 21 each year.

The influence of acute and chronic conditions on activity levels of nonmetro children and youth varies considerably according to family income (see Table 8). For example, nonmetro children residing in families with incomes below the poverty level are reported to spend 14 percent more days ill in bed each year than their counterparts in families with incomes above the poverty level. Prevalence of limitation of

Table 8: Health Status of Children and Youth under Age 21, Residing in Metropolitan and Nonmetropolitan Areas, United States, 1984–1985

	Place of Residence			
	Metro Areas*	Nonmetro Areas†		
	Total	Total	Below Poverty Level	Above Poverty Level
Health status				
Excellent	52.5%	50.1%	39.0%	54.5%
Very good	26.0	26.4	25.6	26.8
Good	18.5	20.3	29.5	16.5
Fair or poor	3.0	3.2	5.9	2.2

Source: Microdata from the 1984 and 1985 National Health Interview Survey.

*Persons residing in metropolitan statistical areas.

†Persons not residing in metropolitan statistical areas.

activity within nonmetro areas also differs by poverty status. Some 4.5 percent of all poor nonmetro children are limited in their activity as compared to 3.1 percent of nonpoor children in nonmetro areas, a 45 percent differential.

SATISFACTION

Ideally, satisfaction should reflect one's degree of contentment with health status. Although many surveys include questions concerning satisfaction with health care services, few attempt to measure satisfaction with one's own health status (Starfield 1974). The closest proxy measure of satisfaction available from the NHIS and most other surveys is self-assessment (or parental assessment for children under 17 years old) of health status in the form of excellent, very good, good, fair, or poor. Since this measure of health reflects the respondent's overall view of his or her health, it should serve at least as a partial proxy for satisfaction with one's health status.

Survey results for 1984–1985 on self-assessed health status are presented in Table 8. These data clearly show that children and youth as a group rate high in terms of health. Over three-fourths of metro and nonmetro children and youth are reported to be in excellent or very good health. It seems clear that these children and youth, or their parents, are satisfied with their health status. Only about 3 in every 100 children nationwide are reported to be in fair or poor health. It can be inferred that this group is less satisfied with its health status. Inspec-

tion of the results in Table 8 suggests that there is little difference in how health status is rated among metro and nonmetro children and youth. However, as with the measures of activity presented, differences exist in perceived health by income. Among nonmetro children and youth, those residing in families with incomes below the poverty level are over twice as likely to be reported in only fair or poor health compared to more advantaged children and youth.

RESILIENCE

Several areas of risk-taking or risk-averting behaviors are important to examine for children and youth, including nutrition, drug use, injuries, and other areas. Due to the limits of published national data on resilience, this section covers only drug use and injuries.

Drug Use

The nonmetro senior class of 1983, according to the National Institute on Drug Abuse, had 30-day prevalence rates similar to metro-area youth for alcohol, cigarettes, tranquilizers, barbiturates, sedatives, and LSD (see Table 9). Some 69 percent of seniors had used alcohol in the past 30 days and 32 percent had smoked cigarettes. The most common drugs used by seniors in nonmetro areas in the past year were alcohol (87 percent), marijuana (37 percent), stimulants (16 percent), cigarettes (14 percent), cocaine (7 percent), sedatives (7 percent), and tranquilizers (7 percent).

Even though adolescents from nonmetro areas are less likely to use certain drugs than are metro youth, they are still at significant risk, particularly for problems associated with regular use of alcohol, cigarettes, marijuana, and stimulants.

Injuries

For most injury categories, significant urban/rural differences can be found. Baker et al. (1984) compiled injury-related mortality data for 1977–1979 from multiple sources and reported that residents of rural areas have higher mortality rates than urban residents for the following injury categories: lightning and exposure (10:1 ratio); machinery and natural disaster (9:1); firearms and falling objects (7:1); pedestrian (nontraffic), excessive cold, and boat drowning (6:1); suffocation and motor vehicle occupancy (5:1); electricity (nonhome) and explosion (4:1); fall on level, clothing ignition, airplane crash, aspiration, and firearms (3:1); alcohol poisoning, electricity (home), motor vehicle

Table 9: Substance Use of 16 Types of Drugs by Metropolitan Status, High School Senior Class of 1983

	Marijuana	*Inhalants*	*Nitrites*	*Hallucinogens*	*LSD*	*PCP*	*Cocaine*
All Seniors	27.0	1.7	1.4	2.8	1.9	1.3	4.9
30-day prevalence							
Large SMSA	31.7	1.8	1.3	3.0	1.5	1.6	8.4
Other SMSA	28.1	1.6	2.4	3.2	2.2	1.5	4.3
Non-SMSA	21.8	1.6	0.2	2.1	1.7	0.7	3.0
Annual prevalence							
Large SMSA	47.0	4.8	4.0	9.2	5.7	4.1	16.9
Other SMSA	44.0	4.4	4.4	7.6	6.0	2.3	11.2
Non-SMSA	36.5	3.9	2.4	5.3	4.4	1.9	7.3
Lifetime prevalence							
Large SMSA	62.3	13.8	9.4	15.1	9.7	8.3	22.6
Other SMSA	58.8	13.4	9.3	12.0	9.6	4.8	16.0
Non-SMSA	50.5	13.8	6.7	9.3	7.3	4.4	11.6

exhaust, drowning (nonboat), cutting/piercing, motorcyclist, aspiration (food), fall from ladder/scaffold; house fire, bicyclist, motor vehicle exhaust, and beating (2:1). Unfortunately, none of the urban/rural data presented in Baker's fact book are broken down by age nor are injury-related morbidity data presented.

In a recent article in *The New England Journal of Medicine*, Baker and her colleagues (1987) examined motor vehicle mortality according to the county in which the crash occurred—one of the few available, detailed geographic analyses of injuries. The highest death rates were found in the most rural counties (fewer than five people per square mile). However, adolescents and young adults (ages 15–24), who nationally make up 40 percent of all motor vehicle deaths, accounted only for about 20 percent of the motor vehicle mortality in rural areas.

While Baker et al. (1984, 1987) found significant rural/urban differences in mortality for most injury categories, the limited injury data from the NHIS do not show such differences (see Table 10). According to the NHIS, injuries resulting in some restriction of activity or episode of medical attention are common in both metro and nonmetro areas. Some 33 accidental injuries occur for every 100 persons under 21 years old each year in nonmetro areas. Most accidental injuries are non-motor vehicle related. Indeed, motor vehicle accidents, while generally more severe on average than other types of accidents, account for only about 5 percent of accidental injuries in nonmetro areas. Approximately one-third of all accidental injuries

Table 9: Continued

Heroin	*Other Opiates*	*Stimulants*	*Sedatives*	*Barbiturates*	*Metha-qualone*	*Tranquilizers*	*Alcohol*	*Cigarettes*
0.2	1.8	8.9	3.0	2.1	1.8	2.5	69.4	30.3
0.3	2.0	9.1	2.9	1.8	1.9	2.4	69.2	30.8
0.2	1.9	9.8	3.2	2.3	2.0	2.6	60.8	29.1
0.2	1.6	7.6	2.9	2.0	1.6	2.5	69.0	31.5
0.6	6.0	18.1	8.0	5.2	5.5	7.0	88.5	44.1
0.4	5.3	19.6	8.4	5.3	5.9	7.2	86.9	13.5
0.7	4.1	15.6	6.2	5.0	4.6	6.5	86.7	14.0
1.2	11.2	26.9	14.5	10.0	10.6	12.9	94.0	71.0
1.1	9.4	28.1	15.1	10.0	10.7	14.4	91.9	69.3
1.5	8.0	25.3	13.5	9.7	8.9	12.2	92.3	72.0

Source: Unpublished data from the 1983 High School Senior Drug Use Survey conducted by the University of Michigan Institute for Social Research, Ann Arbor, for the National Institute on Drug Abuse.

occur in the home, with the remainder occurring at school, work, or other locations. In general, based on NHIS data, the incidence of accidental injuries—both in terms of type and location—is similar for children and youth in metro and nonmetro areas (see Table 10).

HEALTH SERVICES UTILIZATION

PHYSICIAN VISITS

According to the National Health Interview Survey, children and youth from nonmetro areas had an average of 3.7 physician contacts per year as compared to 4.3 made by metro-area children. Table 11 shows also that 25 percent of nonmetro children have not seen a physician in one or more years contrasted with 21 percent of metro children.

Although metro and nonmetro children appear similar in their use of physician services, substantial differences in use of ambulatory care by income level are apparent within nonmetro areas. As many as 30 percent of poor nonmetro children and youth have not seen a physician in more than one year compared to 23 percent of children with incomes above the poverty level (Table 11).

Access to physician services is examined more closely in Table 12

Table 10: Incidence of Accidents Resulting in Restriction of Activity or Medical Attention in Metropolitan and Nonmetropolitan Areas, United States, 1984–1985

	Number of Accidents per 100 Persons under Age 21, per Year	
	Place of Residence	
Type of Accident	*Metro Areas**	*Nonmetro Areas†*
Motor vehicle	3.3	1.2
Nonmotor vehicle		
At home	12.1	11.4
Elsewhere	16.8	17.9
Therapeutic misadventure	1.0	1.3
Injury condition/Adverse reaction	1.2	1.0
All accidents	34.4	32.7

Source: Microdata from the 1984 and 1985 National Health Interview Survey.

*Persons residing in metropolitan statistical areas.

†Persons not residing in metropolitan statistical areas.

Table 11: Physician Service Utilization Characteristics of Children and Youth under Age 21, Residing in Metropolitan and Nonmetropolitan Areas, United States, 1984–1985

	Place of Residence			
	*Metro Areas**	*Nonmetro Areas†*		
	Total	*Total*	*Below Poverty Level*	*Above Poverty Level*
Physician services				
Average annual physician contacts	4.3%	3.7%	3.5%	3.8%
Time since last contact				
Within last year	79.3	74.8	70.3	76.9
Between one and two years	11.6	13.8	15.2	12.9
Two years or more	9.1	11.4	14.5	10.2

Source: Microdata from the 1984 and 1985 National Health Interview Survey.

*Persons residing in metropolitan statistical areas.

†Persons not residing in metropolitan statistical areas.

by comparing physician contacts before and after adjusting for health status. One commonly used measure of access to physician care is the use-disability ratio (Aday, Andersen, and Fleming 1983). This ratio expresses the number of physician contacts reported for each 100 bed days in the population. Using this measure, nonmetro children and

Table 12: Use of Ambulatory Care Services by Nonmetropolitan Children and Youth According to Poverty Status, United States, 1984–1985

Poverty Status	*Unadjusted Average Annual Physician Visits*	*Average Annual Physician Visits per 100 Bed Days*	*Average Annual Physician Visits for Children in Good, Fair, or Poor Health*	*Average Annual Physician Visits for Children in Excellent or Very Good Health*
Below poverty	3.5	88	4.5	2.9
Above poverty	3.8	111	5.3	3.5

Source: Microdata from the 1984 and 1985 National Health Interview Survey.

youth in families with incomes below poverty reported 21 percent fewer physician contacts on an adjusted basis. Another method of examining access to physician services is to compare contact rates for children and youth with similar levels of perceived health status. As can be seen in Table 12, impoverished children and youth residing in nonmetro areas make fewer physician contacts at both ends of the health status spectrum.

The 1985 National Ambulatory Medical Care Survey (NAMCS) collected information about the use of office-based ambulatory care (excluding hospital-based physicians and neighborhood health centers). In NAMCS, visits are classified according to ICD-9-CM classes. Table 13 shows that children under age 15 generally see office-based physicians in metro and nonmetro areas for the same conditions. Roughly 25 percent of all ambulatory visits in both metro and nonmetro areas were for respiratory conditions; 20 percent were for non-illness visits (supplementary classification); 17 percent were for diseases of the nervous system and sense organs; 9 percent were for injury and poisoning; and 7 percent were for infectious and parasitic diseases.

Proportionately fewer children visited physicians in nonmetro areas than in metro areas for nervous system and sense organ diseases and for non-illness (or health supervision) visits. On the other hand, children were more likely to see physicians in nonmetro areas for infectious and parasitic diseases, respiratory diseases, and injuries and poisonings.

To show the differences in ambulatory care use, Table 14 ranks the leading diagnoses for children under 15 in metro and nonmetro areas. For the most part, physicians serving children in both metro and nonmetro areas report the top five diagnoses as health supervision,

Table 13: Physician Visits by Major ICD-9-CM Classes for Children under Age 15, by Metropolitan and Nonmetropolitan Counties, 1985

ICD-9-CM Classes	Total (%)	Metro (%)	Nonmetro (%)
Total	118,768,047 (100.0)	94,949,526 (100.0)	23,818,521 (100.0)
1. Infectious and parasitic diseases	8,178,447 (6.9)	6,237,511 (6.6)	1,940,936 (8.1)
2. Neoplasms	671,775 (0.6)	547,790 (0.6)	123,985 (0.5)
3. Endocrine, nutritional, metabolic diseases, and immunity disorders	630,884 (0.5)	580,077 (0.6)	50,807 (0.2)
4. Mental disorders	1,349,621 (1.1)	1,187,989 (1.3)	161,632 (0.7)
5. Diseases of nervous system and sense organs	21,241,173 (17.9)	17,569,107 (18.5)	3,672,066 (15.4)
6. Diseases of the circulatory system	667,930 (0.6)	604,358 (0.6)	63,572 (0.3)
7. Diseases of the respiratory system	27,724,127 (23.3)	21,492,436 (22.6)	6,231,691 (26.2)
8. Diseases of the digestive system	4,467,215 (3.8)	3,465,384 (3.7)	1,001,831 (4.2)
9. Diseases of the genitourinary system	1,925,228 (1.6)	1,646,895 (1.7)	278,333 (1.2)
10. Diseases of the skin and subcutaneous tissue	5,722,834 (4.8)	4,472,768 (4.7)	1,250,066 (5.2)
11. Diseases of the musculoskeletal system and connective tissue	2,401,689 (2.0)	1,833,482 (1.9)	568,207 (2.4)
12. Symptoms, signs, and ill-defined conditions	3,486,623 (2.9)	2,683,330 (2.8)	803,293 (3.4)
13. Injury and poisoning	9,830,028 (8.3)	7,450,848 (7.8)	2,379,180 (10.0)
14. Supplementary classification	25,911,375 (21.8)	21,398,665 (22.5)	4,512,710 (18.9)
15. All other conditions	2,627,111 (2.2)	2,164,597 (2.3)	462,514 (1.9)
16. Unknown	1,931,987 (1.6)	1,614,289 (1.7)	317,698 (1.3)

Source: Unpublished data from the 1985 National Ambulatory Medical Care Survey.

*Due to rounding of figures, percentages added may not total 100.

otitis media, acute upper respiratory infections, general medical examinations, and acute pharyngitis. Marked differences in ranking among physician visits in metro and nonmetro areas occurred for the following diagnoses:

	Metro	Nonmetro
Certain adverse effects not elsewhere classified	18	6
Acute bronchitis and bronchiolitis	28	9
Common cold	22	12
Asthma	9	14

Further examination is needed to determine if these differences in metro and nonmetro areas are due to variation in incidence or prevalence, or in coding differences. For example, is the relatively high ranking of certain adverse effects in nonmetro areas due to child maltreatment, on the one hand, or other causes, on the other hand, as reported by Baker et al. (1984)? (Note: Certain adverse effects not elsewhere classified include anaphylactic shock; angioneurotic edema; unspecified adverse effect of drug, medicinal, and biological substance; allergy unspecified; shock due to anesthesia; child maltreatment syndrome; adult maltreatment syndrome; and other specified adverse effects.)

Children under 15 vary dramatically, between metro and nonmetro counties, in their use of general and family practitioners versus pediatricians, as presented in Table 15. Specifically, almost 24 million office visits were made by children to physicians in nonmetro counties. Fifty-three percent of these visits were to FP/GPs and only 33 percent were to pediatricians. In contrast, 95 million office visits were made by children to physicians in metro counties; only 18 percent were to FP/GPs and 61 percent to pediatricians. This significant difference in use of FP/GPs and pediatricians is important for two reasons. First, it may indicate a shortage of pediatricians in nonmetro counties. Second, it suggests a shortage of other specialties (e.g., psychiatrists, obstetricians/gynecologists), leaving FP/GPs with the bulk of child health care responsibilities in nonmetro areas.

The distribution of visits by physician's type of practice is also presented in Table 15. One-half of all visits by children were made to nonmetro physicians in solo practice, 20 percent to physicians in partnership with other physicians, and 29 percent to physicians in group

Table 14: Major Diagnoses for Children under Age 15, in Metropolitan and Nonmetropolitan Areas, 1985

Diagnoses	Number in 1,000s and Percent of Visits		Rank	
	Metro (%)	Nonmetro (%)	Metro	Nonmetro
All diagnoses	94,950 (100.0)	23,819 (100.0)	—	—
Health supervision	14,196 (15.0)	2,502 (10.5)	1	1
Otitis media	10,597 (11.2)	2,425 (10.2)	2	2
Acute upper respiratory infection	5,807 (6.1)	1,409 (5.9)	3	3
General medical exam	2,848 (3.0)	1,059 (4.4)	5	4
Acute pharyngitis	3,257 (3.4)	906 (3.8)	4	5
Certain adverse effects, NEC*	1,109 (1.2)	683 (2.9)	18	6
Bronchitis (not specified as acute or chronic	1,980 (2.1)	660 (2.8)	7	7
Acute tonsillitis	2,277 (2.4)	508 (2.1)	6	8
Acute bronchitis and bronchiolitis	551 (0.6)	504 (2.1)	28	9
Streptococcal sore throat and scarlet fever	1,239 (1.3)	503 (2.1)	13	10
Other noninfectious gastroenteritis	1,477 (1.6)	480 (2.0)	10	11
Acute nasopharyngitis (common cold)	677 (0.7)	407 (1.7)	22	12
Viral infection	1,304 (1.4)	392 (1.6)	12	13
Asthma	1,687 (1.8)	390 (1.6)	9	14
Contact dermatitis and other eczema	1,117 (1.2)	359 (1.5)	16	15

Source: Unpublished tabulations from the 1985 National Ambulatory Medical Care Survey.

*Not elsewhere classified.

practices. In metro areas, 41 percent of all visits were made to solo practitioners, 23 percent to partnership arrangements, and 36 percent to group practices. Hence, physicians in nonmetro areas are less likely to work in a group practice than metro-area physicians.

Table 15: Physician Visits by Selected Specialties and Type of Practice for Children under Age 15, by Metropolitan and Nonmetropolitan Counties, 1985

Selected Specialties	*Total* (%)	*Metro* (%)	*Nonmetro* (%)
Total	118,768,047	94,949,526	23,818,521
	(100.0)	(100.0)	(100.0)
	(100.0)	(79.9)	(20.1)
General and family practice	29,659,336	17,047,654	12,611,685
	(25.0)	(18.0)	(52.9)
	(100.0)	(57.5)	(42.5)
Pediatrics	65,524,352	57,656,011	7,868,341
	(55.2)	(60.7)	(33.0)
	(100.0)	(88.0)	(12.0)
Type of Practice	*Total* (%)	*Metro* (%)	*Nonmetro* (%)
Total	118,768,047	94,949,526	23,818,521
	(100.0)	(100.0)	(100.0)
	(100.0)	(79.9)	(20.1)
Solo	51,052,050	39,271,144	11,780,906
	(43.0)	(41.4)	(49.5)
	(100.0)	(76.9)	(23.1)
Partner	28,104,664	21,502,161	6,602,503
	(23.7)	(22.6)	(27.7)
	(100.0)	(76.5)	(23.5)
Group	39,611,333	34,176,221	5,435,112
	(33.4)	(36.0)	(22.8)
	(100.0)	(86.2)	(13.7)

Source: Unpublished data from the 1985 National Ambulatory Medical Care Survey.

HOSPITALIZATION

Largely because of their good health, few children and youth are hospitalized in the United States (Table 16). Overall, fewer than 1 out of every 13 persons under 21 is hospitalized each year. Interestingly, children and youth in nonmetro areas are 29 percent more likely to be hospitalized than their metro counterparts (7.2 percent versus 5.6 percent). However, average lengths of stay are shorter for nonmetro children and youth, so that total hospital days per 1,000 persons is only 12 percent higher in nonmetro areas. One factor that may account for the differences in hospitalization rates between metro and nonmetro children is variation in practice patterns among family practitioners and pediatricians (Kozak and McCarthy 1984; Osgood et al. 1980).

Table 16: Hospital Care Utilization Characteristics of Children and Youth under Age 21, Residing in Metropolitan and Nonmetropolitan Areas, United States, 1984–1985

	Place of Residence			
	*Metro Areas**	*Nonmetro Areas†*		
	Total	*Total*	*Below Poverty Level*	*Above Poverty Level*
Hospital services				
Percent with one or more hospital admissions in last year	5.6	7.2	9.5	6.8
Average number of hospital days per 1,000 persons per year	299	334	459	284

Source: Microdata from the 1984 and 1985 National Health Interview Survey.

*Persons residing in metropolitan statistical areas.

†Persons not residing in metropolitan statistical areas.

Another factor that might account for the greater number of hospital days per 1,000 children in nonmetro areas is the higher poverty rate for rural children and youth. As illustrated in Table 16, nonmetro children with family incomes below poverty are 40 percent more likely to be hospitalized and spend 62 percent more days in the hospital than their higher-income nonmetro counterparts. Hence, were the poverty rate to be reduced in nonmetro areas, hospital utilization might look more like that found in metro areas.

PRENATAL CARE USE

According to the 1980 National Natality Survey (NNS),[3] 33 percent of all births occurred among women in nonmetro areas. Table 17 shows that pregnant women in nonmetro areas were somewhat less likely than metro women to begin their prenatal care in the first trimester (75 percent versus 79 percent). In addition, 5 percent of nonmetro pregnant women received inadequate prenatal care, measured by care beginning in the third trimester or not at all (*Note*: this measure of adequacy does not incorporate the number of visits or the quality of prenatal care).

Singh et al. (1985) examined the characteristics of women receiving inadequate care in metro and nonmetro areas. Their analyses focused on the age of the mother, and her marital and poverty status. Summarized in Table 17, their results—from analysis of the 1980

Table 17: Prenatal Care Use by Women Residing in Metropolitan and Nonmetropolitan Areas, 1980

Selected Characteristics	*Metro*	*Nonmetro*
Number of births	2,406	1,206
Percent	66.6	33.4
Trimester in which care was begun		
First	79.0	75.4
Second	16.5	19.5
Third	3.4	4.2
No care	1.2	0.8
Age of mothers receiving inadequate prenatal care (third trimester only, or no care)		
20	10.3	8.9
20-24	4.8	5.3
25	2.7	3.4
Marital status and age group of mothers receiving inadequate prenatal care		
Married		
Total	2.8	3.5
20	5.1	5.0
20-24	3.1	4.0
25	2.4	2.8
Unmarried		
Total	11.1	13.7
20	14.6	15.5
20-24	10.8	13.0
25	5.9	10.8
Poverty and marital status of mother receiving inadequate care		
Poor (≤150% of poverty level)		
Married	5.5	5.3
Unmarried	12.5	16.7
Nonpoor		
Married	2.1	2.8
Unmarried	8.4	6.4

Source: Singh, S., A. Torres, and J. D. Forrest. "The Need for Prenatal Care in the United States: Evidence from the 1980 National Natality Survey." *Family Planning Perspective* 17, no. 3 (May/June 1985):118-24.

National Natality Survey (NNS) data—show that 50 percent of nonmetro pregnant women with inadequate care were under age 20 and the other half were above age 20. Some 14 percent of unmarried nonmetro women received an inadequate amount of prenatal care as compared to 11 percent of metro women. The largest difference in

adequacy of amount of prenatal care between metro and nonmetro women was found among unmarried women over 25. Nonmetro women in this group were twice as likely to receive inadequate care as women in metro areas.

Kleinman et al. (1983) also examined the 1980 NNS by residence and reported that only 57 percent of black women in southern nonmetro areas received early prenatal care (first trimester) as compared to 67 percent in metro areas. Kleinman et al. (1983) analyzed the use of amniocentesis, ultrasound, medical x-rays, and electronic fetal monitoring based on the 1980 NNS data. The NCHS researchers found that women in rural areas and southern black women in particular had less access to these obstetric technologies. For example, 25 percent of white and 19 percent of black nonmetro mothers had one or more ultrasound examinations as compared to 32 percent of white and 25 percent of black metro mothers.

Prenatal care utilization patterns that may require further examination are the delay in seeking prenatal care until the second trimester and the receipt of inadequate prenatal care by 5 percent of all nonmetro pregnant women.

ORGANIZATION AND DELIVERY OF HEALTH CARE SERVICES

The organization and delivery of rural maternal and child health services can be characterized by (1) the supply of physicians; (2) regionalized maternal, perinatal, and pediatric networks; and (3) other access and delivery innovations and interventions.

SUPPLY OF PHYSICIANS

Tables 18 and 19 present information on trends in the distribution of nonfederal physicians. Using data from the American Medical Association, Newhouse et al. (1982) examined communities by size of population with physician specialty services and found that the percentage of rural areas with a physician improved significantly between 1970 and 1979. In communities of fewer than 20,000, there was no increase in the percent of population served by general and family practitioners, and for obstetrics/gynecology, the increase was minimal. However, among pediatricians and psychiatrists, there was a marked increase as shown in Table 18.

The AMA's most recent report on physician characteristics (1986)

Table 18: Percentage of Communities by Size of Population with Nonfederal Physician Specialty Services in 1970 and 1979*

Specialty and Year	*Number of FTE Physicians† in 23 Sample States*	*Percentage of Communities, by Size of Population‡*						
		2.5–5	*5–10*	*10–20*	*20–30*	*30–50*	*50–200*	*200+*
General and family practice								
1970	11,514	89	96	99	100	100	100	100
1979	11,869	86	96	99	100	100	100	100
Obstetrics/ Gynecology								
1970	2,928	13	32	74	96	100	100	100
1979	3,978	15	35	77	97	100	100	100
Pediatrics§								
1970	2,263	6	17	57	92	100	100	100
1979	3,429	12	25	68	92	100	100	100
Psychiatry								
1970	1,990	3	12	28	46	91	100	100
1979	3,203	9	17	40	59	96	100	100

Source: Newhouse, J., A. Williams, B. Bennett, and W. Schwartz. "How Have Location Patterns of Physicians Altered the Availability of Medical Services?" *The RAND Publication Series*. Santa Monica: RAND, May 1982.

*Data are from the 23 states listed in the text. Population of towns is specific to the relevant year.

†Full-time equivalent (FTE) physicians in hospital and office-based practice, excluding resident physicians, as of December 31. For physicians with more than one specialty, fractions of FTEs are allocated according to the rules described in the text.

‡In thousands.

§Includes pediatric cardiology and other pediatric subspecialties; does not include pediatric allergy.

shows that the overall distribution of physicians in metro and nonmetro areas changed little between 1970 and 1985 (see Table 19). In 1970, 14 percent of physicians practiced in nonmetro areas and in 1985, 13 percent. Of special interest to children are the physician practice trends for office-based practice, specifically general practice. Office-based physicians (general practice, medical specialties, surgical specialties, and other specialties) in nonmetro areas experienced tremendous growth between 1970 and 1985. Examining general practice illustrates, for example, that between 1970 and 1975, there was an 11 percent decline; between 1975 and 1980, a 2 percent increase; and between 1980 and 1985, a 13 percent rise. The greatest increase between 1970

Table 19: Trends in the Distribution of Nonfederal Physicians in Metropolitan and Nonmetropolitan Areas, 1970–1985

	Total Physicians	*Total Patient Care*	*Office-Based Practice*	*General Practice*	*Medical Specialty*	*Surgical Specialty*	*Other Specialty*
1970							
Total	301,323	255,027	188,924	50,816	43,796	58,910	35,402
Metro (%)	85.7	85.4	82.6	67.6	89.6	86.2	89.6
Nonmetro (%)	14.3	14.6	17.4	32.4	10.4	13.8	10.4
1975							
Total	359,683	287,837	213,334	46,347	54,332	67,300	45,355
% change							
1970–1975	19.4	12.9	12.9	-8.8	24.1	14.2	28.1
Metro	87.1	86.6	83.9	68.6	90.0	85.9	89.4
% change	21.3	14.5	14.7	-7.4	24.6	13.9	27.7
Nonmetro	12.9	13.4	16.1	31.4	10.0	14.1	10.6
% change	8.0	3.4	4.4	-11.6	19.6	16.3	31.3
1980							
Total	443,502	361,915	271,268	47,772	75,883	81,877	65,736
% change							
1975–1980	23.3	25.7	27.2	3.1	39.7	21.7	44.9
Metro	86.9	86.4	84.4	68.8	89.2	85.5	88.7
% change	23.1	25.5	27.9	3.4	38.5	21.1	43.9
Nonmetro	13.1	13.6	15.6	31.2	10.8	14.5	11.3
% change	25.0	27.5	23.5	2.4	50.2	24.8	54.1
1985							
Total	528,169	431,527	329,041	53,862	98,762	94,918	81,499
% change							
1980–1985	19.1	19.2	21.3	12.7	30.2	15.9	24.0
Metro	86.6	86.3	84.2	68.7	88.5	85.2	88.1
% change	18.7	19.1	21.0	12.5	29.2	15.4	23.2
Nonmetro	13.4	13.7	15.8	31.3	11.5	14.8	11.9
% change	21.4	19.9	22.6	13.3	38.2	18.8	30.2

Source: American Medical Association. *Physician Characteristics and Distribution in the U.S.*, 1986 Edition. Chicago, IL: AMA, 1986.

and 1985 in office-based practices occurred among medical specialties (38 percent rise) and among other specialties (30 percent increase). Despite this growth in overall physician supply in rural areas, the gap between metro and nonmetro communities remains roughly the same in 1985 as it was in 1980.

A significant body of literature exists on the retention of pediatricians (and other specialties) in rural primary care programs (American Academy of Pediatrics 1986). Researchers at the University of North Carolina conducted a national evaluation of rural primary health care

programs (Ricketts and Guild 1983), and found that pediatricians were more likely to leave a rural community when there were high proportions of minorities, low levels of insurance, competition among primary care providers, distant hospitals, poor bookkeeping and bill collection, and insufficient nonphysician health services.

Problems surrounding malpractice liability insurance have had a major effect on the availability of obstetrical care in rural areas. In a 1986 telephone survey of 126 rural Arizona obstetricians, FP/GPs, and osteopathic physicians, 21 percent had discontinued their obstetrical service in the previous three years as a result of high malpractice insurance premiums (Gordon et al. 1987). An additional 10 percent planned to end their obstetrical practice when their malpractice insurance policy expired. Gordon et al. (1987) commented on this 30 percent decline in obstetric practice:

> Women in many rural areas already have pregnancy outcomes that are inferior to their urban counterparts. A further decrease in the availability of obstetrical providers may have additional adverse effects on pregnancy outcome.

Assuring adequate financial support is critical in maintaining a viable medical practice. Financial stability depends greatly on the ability and creativity of physicians in using Medicaid and the Early and Periodic Screening, Diagnosis, and Treatment Program (EPSDT); other publicly subsidized services, such as the Women, Infants, and Children Program (WIC) and special education services under P.L. 94-142 and P.L. 99-457); and reasonable sliding fee scales. Since pregnant women and children in rural areas are less likely to be insured, and are more likely to be poor and to reside in communities with inadequate physician supply, the availability of publicly subsidized primary care services has special significance. These include funds from the Title V Maternal and Child Health (MCH) Block Grant, community and migrant health centers, the National Health Service Corps, and Indian Health Services, among others. The need for adequate financing to ensure access to health care services has been well documented, particularly for rural populations (Berk et al. 1983; Kasper 1983; Wallach and Kretz 1981).

REGIONALIZED PERINATAL CARE

Concerned with disproportionately high infant mortality rates in rural areas, the Robert Wood Johnson Foundation initiated its Rural Infant Care Program (RICP) in 1979. The major elements of the foundation's strategy were to improve the system of regionalized perinatal care in

ten sites through education and training; cooperative arrangements among medical schools, state health departments, and local providers; early identification of high-risk pregnancies; and increased referrals to tertiary centers. Gortmaker, Clark, Graven, et al. (1987) evaluated the effects of the RICP using three different comparison areas and time series of vital statistics data. The Harvard researchers found, through their time series regression models, that the RICP was responsible for a neonatal mortality decline of 2.6 per 1,000 or a 22 percent reduction. Postneonatal mortality rate reductions, however, were not associated with the RICP. Among black infants, the effect of the RICP program was the greatest—the neonatal mortality rate declined 4.5 per 1,000. Overall, nine of the ten sites reduced their infant mortality rates following initiation of the RICP; three of these reductions were statistically significant. Neonatal mortality decreases were also statistically significant in four of the eight sites that reported them. There were no significant changes in the comparison sites during this same time period.

Gortmaker concluded that "infant mortality rates in poor, isolated rural areas with substantial minority populations can be changed to average levels experienced in the United States. Furthermore, these changes can be induced rather rapidly through changes in the delivery of health care."

Shapiro et al. (1983) also evaluated the effectiveness of newborn intensive care in the RICP sites, as measured by morbidity during the infants' first year of life. This group of researchers from Johns Hopkins University found a 16 percent decline in mild congenital anomalies and/or developmental delays among the low birth weight infants, but no change in the proportion with severe congenital anomalies and/or developmental delays.

Although such initiatives as the RICP may be effective, problems surrounding the persistent insurance gaps among rural women and children coupled with the malpractice crisis, physician shortages, and recent hospital closures are likely to have a profound effect on the availability of obstetrical services as well as on prospects for the development of strong perinatal regionalization networks.

ACCESS AND DELIVERY INNOVATIONS

Because of the diverse and often unique needs of rural MCH populations, there has been ongoing public and private support for interventions and other innovations aimed at improving access to health services.

A considerable investment continues to be made in the training of community or "lay health workers" to educate and link rural pregnant women and children with existing health care systems. This has been most successful in geographically isolated communities and those with large minority populations. For example, the University of North Carolina has developed a migrant lay health advisor program intended to improve perinatal and infant outcomes among migrant farmworkers (USDDS/Watkins 1987). The lay health advisors' responsibilities include dissemination of health information in a culturally appropriate manner, linking migrant women and children to health services, and leadership and advocacy development.

Despite the support for outreach and community health aides and the growing literature on their effectiveness in improving utilization and outcomes (Olds et al. 1986), most of these services are provided in nontraditional health care settings by nonphysicians who have historically been uninsured or underinsured and not well integrated into medical services. Consequently, maintaining or institutionalizing outreach has been difficult for most rural communities (McManus 1987).

According to the 1986 Robert Wood Johnson-sponsored National Access Survey, access to health care services for rural residents continues to improve, according to measures of those with a regular source of care, of travel time, and of those who saw a physician in the last year (Freeman 1987). This has to be tempered, however, with the finding that rural Americans are more likely to be in poor health.

RURAL HEALTH CARE FINANCING

According to the 1980 National Medical Care Utilization and Expenditure Survey (NMCUES) 1.4 million or 12 percent of all rural children under 18 were uninsured for all of the year (Butler et al. 1985). Another 1.9 million or 16 percent were insured for only part of the year. Therefore, only 73 percent of all rural children were insured for the entire year as compared to 83 percent of children who resided in metro non-central cities and 75 percent in metro central cities, according to Table 20.

Of the privately insured rural child population, 14 percent were insured for part of the year. Compared to metro children both in central and non-central cities, part-year private insurance coverage is more common among rural children, as illustrated in Table 20. Among part-year publicly insured rural children, the opposite case can be made. Some 6 percent are publicly insured for only part of the year.

Table 20: Health Insurance Coverage and Out-of-Pocket Medical Payments for Children and Youth, Ages 0 to 18, by Population Density, 1980

	Population Density			
Insurance Characteristics	*SMSA Central City (%)*	*SMSA Non-Central City (%)*	*Urban Non-SMSA (%)*	*Rural (%)*
Health insurance coverage				
Not insured	9.3	4.6	9.5	11.6
Insured for part year	15.3	12.1	13.4	15.5
Insured for entire year	75.4	83.3	77.2	72.9
Private and public coverage				
Private insurance				
Part year	13.9	11.2	12.9	14.3
Full year	52.9	72.3	66.2	64.4
Public insurance				
Part year	9.1	8.1	6.2	5.7
Full year	24.1	13.0	13.4	11.0
Total medical charges paid out-of-pocket				
0.00	23.8	13.3	12.4	9.4
0.01-50.00	27.6	33.9	31.4	24.9
50.01-99.99	17.8	22.2	21.6	21.9
100.00	30.8	30.6	34.6	43.7

Source: Butler, J., W. Winter, J. Singer, and M. Wenger. "Medical Care Use and Expenditure among Children and Youth in the United States; Analysis of a National Probability Sample." *Pediatrics* 76, no. 4 (October 1985):495-506.

*Due to rounding of figures, percentages added may not total 100.

For metro children, the issue of part-year public insurance is far more troublesome.

Butler et al. also examined out-of-pocket payments for medical care and found that families of rural children paid the greatest proportion of total bills out-of-pocket. Table 20 shows that as many as 44 percent of all rural children paid for their medical care entirely out-of-pocket as compared to 31 percent for families of metro central-city children. Another 22 percent of all rural children self-paid between 50-99 percent of their medical bills.

Historically, private insurance coverage for individuals residing in rural areas has been limited due to several factors, including employment in low-wage and low-benefit industries, in small businesses, and in part-time arrangements as well as in self-employment. Oftentimes self-employed families and those working in small businesses tend to

purchase health insurance that covers hospitalization but offers little for preventive and non-hospital-based care.

Medicaid coverage differs significantly between urban and rural areas, as demonstrated in Tables 21 and 22. In these tables states are ranked according to the proportion of their population residing in metro and nonmetro counties. Based on eligibility threshold characteristics, poor children and pregnant women who reside in urban states have a greater likelihood of obtaining Medicaid eligibility than do their counterparts in predominantly rural states. The average Medicaid eligibility threshold for a family of three receiving Aid to Families with Dependent Children (AFDC) in the ten most urban states was $5,102 or 56 percent of the federal poverty level in 1986. In the ten most rural states, the average Medicaid eligibility threshold is only $4,331 or 47 percent of poverty.

In all ten of the most urban states, persons with incomes above the AFDC limit can gain Medicaid eligibility through Medically Needy programs. In these states the average medically needy income threshold is $6,641 or 73 percent of the federal poverty level. Families with incomes below these cutoffs are automatically eligible for Medicaid services. Families with incomes above the cutoffs can "spend down" to achieve eligibility. Four of the ten most rural states do not have Medically Needy programs: Idaho, Mississippi, South Dakota, and Wyoming. Of the six remaining rural states, the medically needy income threshold averages only $5,145 or 56 percent of the federal poverty level. Clearly, in most rural states, the income-eligibility thresholds are very restrictive.

In the ten most urban states, all children under 18 whose family incomes are below the state-set income threshold level for Medicaid are covered. In other words, these urban states provide Medicaid coverage to children who live in two-parent families and to the children of working-poor parents. However, five of the ten most rural states fail to cover these children. Finally, under the Sixth Omnibus Budget Reconciliation Act (OBRA) of 1986, states were allowed to expand their Medicaid program to cover pregnant women and infants in families with incomes below the federal poverty level without raising cash assistance levels. Eight of the top ten urban states have implemented this important expansion. At the time of this writing, only four of the ten most rural states planned to offer this eligibility expansion.

Participation in Medicaid has been limited in rural areas for several reasons: low AFDC and medically needy income-eligibility thresholds, eligibility criteria that restrict two-parent families from coverage, limitations regarding working-poor families, and failure to implement

Table 21: Medicaid Coverage of Children and Pregnant Women in Top Ten Rural States, 1986*

	State	Percent Nonmetro Population	AFDC Family of 3	Percent of Poverty ($9,120)	Medically Needy Family of 3	Percent of Poverty	All Children < 18 with Family Incomes < Poverty	Pregnant Women and Infants Federal < Poverty
1.	Idaho	80.9	$3,648	40.0	No Program		No	No
2.	Vermont	77.2	6,372	69.9	7,296	80.0	Yes	Yes
3.	Montana	75.7	3,984	43.7	4,848	53.2	Yes	No
4.	South Dakota	72.1	4,392	48.2	No Program		No	No
5.	Wyoming	71.4	4,320	47.4	No Program		No	No
6.	Mississippi	70.6	4,416	48.4	No Program		Yes	Yes
7.	Maine	63.9	6,432	70.5	6,300	69.0	Yes	No
8.	North Dakota	63.6	4,452	48.8	5,220	57.2	No	No
9.	West Virginia	63.3	2,988	32.8	3,480	38.1	No	Yes
10.	Arkansas	60.9	2,304	25.3	3,100	34.0	Yes	Yes

Sources: 1985 Census data; 1986 data from the National Governors' Association; September 1987 information from the Children's Defense Fund; and 1985 Health Care Financing Administration data.

*Top ten rural states are defined as those with the highest percentage of residents living in nonmetro areas.

Table 22: Medicaid Coverage of Children and Pregnant Women in Top Ten Urban States, 1986*

	State	Percent Metro Population	AFDC Family of 3	Percent of Poverty ($9,120)	Medically Needy Family of 3	Percent of Poverty	All Children < 18 with Family Incomes < Poverty	Pregnant Women and Infants Federal Poverty
1.	District of Columbia	100.0	4,200	46.1	5,820	63.8	Yes	Yes
2.	New Jersey	100.0	4,848	53.2	6,492	71.2	Yes	Yes
3.	California	95.7	7,404	81.2	9,900	108.6	Yes	NA (already covers MN program)
4.	Maryland	92.9	4,140	45.4	4,908	53.8	Yes	Yes
5.	Connecticut	92.6	6,060	66.4	7,300	80.0	Yes	Yes
6.	Rhode Island	92.5	5,292	58.0	7,600	83.3	Yes	Yes
7.	Florida	91.0	3,024	33.2	4,092	44.8	Yes	Yes
8.	Massachusetts	90.9	5,712	62.6	7,896	86.5	Yes	Yes
9.	New York	90.5	5,964	65.4	7,300	80.0	Yes	No
10.	Pennsylvania	84.6	4,380	48.6	5,100	55.9	Yes	No

Sources: 1985 Census data; 1986 data from the National Governors' Association; September 1987 information from the Children's Defense Fund; and 1985 Health Care Financing Administration data.

*Top ten urban states are defined as those with the highest percentage of residents living in metro areas.

recent Medicaid expansions. While several of these restrictive eligibility rules are changing, many are still maintained in rural areas. On a positive note, several southern, predominantly rural states with historically restrictive Medicaid eligibility standards (including South Carolina, Mississippi, and Arkansas) have recently been in the forefront of Medicaid expansions.

SUMMARY AND CONCLUSION

Rural maternal, child, and adolescent health services research is extremely limited. Most of the literature uses 1970s data, with few exceptions (rural perinatal care). Published information from the surveys of the National Center for Health Statistics is usually not organized into useful groupings by metro/nonmetro status, such as three-year child-age intervals (0-2, 3-5, 6-8, 9-11, 12-14, 15-17, 18-20, 21-23, and 24-26). Not even microdata from the NCHS data bases can be considered very useful for rural analysis, because metro/nonmetro status does not adequately take into account variation in population density within and outside of metropolitan statistical areas.

Using the current definitions of metro/nonmetro status, children residing in nonmetro areas as compared to children in metro areas are more likely to be:

- White, living in two-parent families, residing in the South, and poor
- As healthy or slightly healthier, as measured by mortality, acute and chronic conditions, bed days, and drug use
- Similar or slightly lower users of physician services
- Served by FP/GPs instead of pediatricians, and
- Uninsured or underinsured (as measured primarily by part-year private coverage), residing in the least generous Medicaid states, and liable for greater out-of-pocket medical costs relative to their family income.

Of special concern are the nearly 5 million nonmetro children residing in poverty. These children are at significantly greater risk for receiving inadequate ambulatory care and higher levels of hospitalization than are nonmetro children in families with incomes above the poverty level. Poor nonmetro children, for example, are reported to have 21 percent fewer physician contacts; they are 40 percent more

likely to be hospitalized, and they spend 62 percent more days in the hospital.

An understanding of problems surrounding the financing of care for maternal, child, and adolescent health in rural areas is central to designing changes that could lead to future improvements in health services utilization and, ultimately, to health status improvements, for the nonmetro population. Restrictions in Medicaid eligibility for two-parent as well as working-poor families, and for those with relatively high medical expenses, have severely limited the availability of Medicaid for the rural poor. Even more important than the failure of predominantly rural states to add optional eligibility groups and medically needy programs are the persistently low financial eligibility criteria in the more rural states.

Federal law now permits Medicaid expansions for pregnant women and infants up to 100 percent of the federal poverty level without raising cash assistance levels. However, few rural states appear to be taking advantage of this new authority. This failure to extend Medicaid to cover as many poor pregnant women and children as possible combined with the inadequate insurance offered by many small businesses has contributed to what appears to be a growing health care financing crisis in rural states. Inadequate insurance protection contributes to lower-than-average physician utilization rates and higher hospitalization rates as well as to the ongoing problems associated with the availability and viability of pediatric and obstetric services in rural areas.

In summary, three major problem areas emerge from this analysis of rural MCH: (1) inadequate insurance coverage of children and pregnant women, (2) growing obstetric access crisis due to reimbursement and malpractice problems, and (3) de-regionalization of perinatal networks.

RESEARCH RECOMMENDATIONS

GENERAL RECOMMENDATIONS

The field of rural maternal, child, and adolescent health suffers from a general absence of current literature on health status, health services utilization, organization and delivery of health services, and health care financing.

Since much of the NCHS data fail to show major differences in health status and utilization between metro and nonmetro children and

youth, small-area population-based studies should be initiated to determine if these national data have failed to identify major health problems. In the case of injuries, for example, national data do not show large differentials among metro and nonmetro areas. Using smaller geographic area analyses, however, Baker et al. (1984) consistently found major differences in injury-related mortality between rural and urban areas.

Additional small area studies on injury morbidity, chronic childhood illness, adolescent pregnancy, and psychosocial problems among children in rural areas would contribute to our knowledge regarding the limits of national data for specific rural health problems.

Geographic measures (other than metro/nonmetro status) for analyzing rural health that more adequately incorporate population density, such as the U.S. Census definitions of rural and urban, would be an improvement. Even better would be to divide counties according to various categories of population density (persons per square mile). Unfortunately, most nationally representative health surveys continue to use only the metro/nonmetro dichotomy.

Publication and analysis of additional rural health data from the National Center for Health Statistics' ongoing surveys by residence, by three-year child age intervals, and by minority status would also assist researchers and providers attempting to monitor rural child health needs and to compare small area studies with national survey data.

SPECIFIC RECOMMENDATIONS

In addition to the general research needs described, several specific health status, delivery, and financing issues require further examination. They include:

1. Analysis of national and population-based data related to physical and behavioral illnesses or problems; functional status; signs and symptoms; risk-taking and risk-averting behavior; and development and social competence for rural children, in general, and for rural southern black, Hispanic, Native American, Appalachian white, other poor white, and Eskimo children, in particular.
2. Analysis of the differences in higher fetal death rates in nonmetro versus metro areas. What characteristics other than place of residence differentiate the two groups? What are the major causes of fetal death? When in pregnancy (e.g., prenatal or intrapartum) do fetal deaths occur? Is there a difference in the content of prenatal and/or intrapartum care received

by nonwhites in rural areas compared with its content in metro areas? What environmental factors (e.g., work outside the home, exposure to pesticides, smoking, other drugs and toxic agents) influence the fetal death rate differences in nonmetro versus metro areas?

3. Analysis of rural/urban differences in injury data and potential strategies for prevention, including improved access to regionalized health services and environmental modifications.
4. Assessment of the differences in rates of impairments among metro/nonmetro poor children to determine the validity of national data and the use of preventive services in metro/nonmetro areas.
5. Examination of the effect of malpractice, hospital closures, and inadequate financing of health services on: obstetric personnel shortages, changes in the distribution and practice patterns of nurse midwives, and perinatal mortality and regionalization.
6. Development of new approaches for (a) identifying health personnel shortage areas that go beyond physician-population ratios and incorporate physicians' availability to accept some or all patients (particularly Medicaid, uninsured, and chronically ill persons); and (b) targeting federal and state resources to serve those areas. Development of methods for identifying rural areas with excessive perinatal mortality, using linked birth-death certificates, to incorporate into the designation of medically underserved areas (Williams et al. 1980).
7. Analysis of differences in practice patterns among family physicians, general practitioners, and pediatricians in rural areas and the effects of these differences on quality of care. Development of ongoing physician education projects to identify recommended practice patterns.
8. Reassessment of the viability of pediatric and obstetric practices in rural areas.
9. Analysis of the major causes of inadequate ambulatory care use and greater-than-average hospitalization rates among rural poor children, including differences in health status, sociodemographic factors, availability of appropriate providers, variation in practice patterns, and insurance status.

Can the differentials in health services utilization among rural poor children be ameliorated through financing changes, health personnel expansions, health education strategies, quality assurance programs, and/or other mechanisms?

10. Development of ongoing outreach models to link rural poor children with health care providers.
11. Reexamination of rural federal health program evaluations to assess high-risk population targeting, needs assessment, utilization of services, financing of care, and program effectiveness.
12. Identification of the major causes of lack of insurance coverage among families with infants, children, and adolescents in rural areas.
13. Evaluation of the depth of public and private insurance coverage for child health supervision services and prenatal care in rural areas.
14. Analysis of the extent to which Medicaid expansions (including eligibility expansions, better use of EPSDT, and higher reimbursement rates) plus more aggressive marketing of Medicaid might reduce the high levels of uninsurance among rural families.
15. Development of an insurance education campaign to assist rural families in understanding their existing insurance policies and options for enhancing benefits and reducing out-of-pocket liabilities.
16. Examination of financial incentives and innovative mechanisms for small employers to purchase insurance coverage at reasonable rates, and to offer dependent and catastrophic coverage for minimum wage and part-time employees.

NOTES

1. Child refers to children ages 1–12, adolescents are ages 13–19, and young adults are ages 20–25.
2. As used here, metropolitan residence is defined as residence within a metropolitan statistical area (MSA) as established by the U.S. Office of Management and Budget. Generally speaking, an MSA consists of a county or group of counties containing at least one city (or twin cities) having a population of 50,000 or more, plus adjacent counties that are metropolitan

in nature and linked socially and economically to the central city. For a fuller description, see Moss and Parsons (1986).

3. The 1980 National Natality Study was the first nationally representative survey on obstetric practices for mothers with live births in the United States.

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