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Use of the National Health Interview Survey Linked to Medicaid Analytic eXtract Data to Identify Children With Medicaid-covered Births

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Abstract

Background—The National Center for Health Statistics (NCHS) links survey data with administrative data sets, such as Medicaid enrollment and claims data, to enhance the scientific value of NCHS population health survey sources.

Objective—This report illustrates the use of National Health Interview Survey (NHIS) data linked to Medicaid Analytic eXtract (MAX) data to identify children whose births were covered by Medicaid, as indicated in MAX data, among those participating in NHIS in early childhood, and briefly describes their selected health characteristics.

Methods—The 1999–2005 NHIS linked to 1999–2001 MAX data were used. The approach for using MAX data to identify child survey participants who were enrolled in Medicaid at birth is described. Selected demographic and health characteristics of these children are reported.

Results—Using the linked data files, 2,492 children aged 0–4 years at the time of NHIS interview were identified as having been enrolled in Medicaid at birth as captured in the MAX data. Most of these children continued to have public insurance at the time of interview (69.9%), while 18.7% had private insurance, and 11.4% were uninsured. Most of the children were in very good or excellent health (79.1%) and had not experienced an unmet medical care need due to cost in the past year (95.3%).

Conclusions—Longitudinal follow-up of children who were enrolled in Medicaid at birth is feasible with the linked NHIS and MAX data files. Nearly 2,500 child survey participants aged 0–4 years in the 1999–2005 NHIS were identified as enrolled in Medicaid at birth during 1999–2001. The 1999–2001 MAX files linked to NHIS through 2015, available in 2018, will be able to examine health characteristics for older children and adolescents who were enrolled in Medicaid at birth.

Keywords: mothers • longitudinal • health insurance • access to care • health status • NHIS

Introduction

Federal health surveys provide critical public health information for the United States. Collaborating with other public and private health partners, the National Center for Health Statistics (NCHS) uses a variety of data collection mechanisms to obtain information from multiple sources, including several population-based health surveys, establishment surveys, and vital statistics. This process provides a broad perspective to help describe the population's health, influences on health, and health outcomes. As the nation's principal health statistics agency, NCHS is expanding the use of administrative data for statistical purposes to provide the public and policy makers with more comprehensive and objective data. NCHS is also providing additional information to inform policy, budget, and operational and management decision-making.

NCHS' record linkage program is designed to maximize the value of NCHS population-based surveys by augmenting survey data with information from administrative data sources, such as vital statistics, Medicare and Medicaid enrollment and claims, and Social Security benefit history. Beyond enhancing survey data, record linkage



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also reduces the cost burden of obtaining additional information from survey participants, given the expense of active follow-up of survey respondents. Linkages are conducted between several NCHS population-based surveys and Medicaid and Medicare records from the Centers for Medicare & Medicaid Services (CMS) (1). These linked survey files provide a unique opportunity to examine the factors that influence health status, disability, chronic disease, health care utilization, and expenditures in the elderly, disabled, and poor populations of the United States.

Over time, Medicaid has covered an increasingly higher percentage of deliveries in the United States (2) and is now a sizeable source of health insurance coverage for U.S. births. In 2016, 42.6 % of births were covered by Medicaid (2). Some children enrolled in Medicaid at the time of birth continue to have Medicaid coverage throughout their childhood whereas others do not. While children may be enrolled and unenrolled several times throughout the course of their childhood, sometimes referred to as Medicaid “churning,” many children who are ever covered by Medicaid are covered continuously by Medicaid for several years during their childhood. A longitudinal analysis following children during a 5-year period showed that, of all children enrolled in Medicaid at some point during the 5-year timeframe, 51.5% were enrolled in Medicaid during all 5 years (3).

While population health surveys, such as the National Health Interview Survey (NHIS), can be used to describe children enrolled in Medicaid at the time of survey participation, Medicaid status as reported on surveys is known to be underreported (4). Further, even when accurately reported, the status at interview does not capture the coverage throughout childhood. Medicaid claims data are limited to information obtained for billing purposes, and detailed claims are not always available for enrollees in managed care programs (1,5). As a result, Medicaid enrollment and claims alone do not provide sufficient information for all health studies.

Using NHIS linked to Medicaid Analytic eXtract (MAX) data, this report illustrates the ability of these

linked data to assess health outcomes of children whose births, occurring during 1999–2001, were covered by Medicaid and who participated in the 1999–2005 NHIS during early childhood. Medicaid coverage at birth is captured in MAX data, based on maternal enrollment in Medicaid at the time of delivery. Unlike other surveys, NHIS collects identifying information from multiple members of the household, which enabled the identification of children enrolled in Medicaid at birth using their mothers’ Medicaid information for this report. Selected demographic and health characteristics available from NHIS for identified children are shown.

Methods

Data sources: NHIS–MAX linked data

Each year since 1957, NCHS has administered NHIS, a nationally representative, cross-sectional health survey of the civilian noninstitutionalized population. The design is a multistage sample with primary sampling units of counties or adjacent counties, secondary sampling units of clusters of houses, and tertiary sampling units of households and persons within households. Detailed descriptions of the NHIS sample design are described elsewhere (6). For the NHIS years included in this report, household response rates for NHIS range from a low of 86.5% in 2005 to a high of 89.6% in 2002.

Medicaid eligibility and claims files are submitted individually by each state to the Medicaid Statistical Information System (MSIS). An extract of these files, the MAX files, is then created for research purposes by CMS (7). The MAX files contain information on Medicaid eligibility and claims. Data from the Children’s Health Insurance Program (CHIP) are included for only some states in the MAX files. Births covered by CHIP, as noted in the MAX files, are not included in this analysis.

This report uses the most recent linked data available at the time it was written. Data from the 1994–2005 NHIS and 1999–2009 MAX files were linked following an established

algorithm described elsewhere (1). In brief, NHIS linkage-eligible participants were identified as those who did not refuse to provide their Social Security number (SSN) or health insurance claim number, had sufficient personally identifiable information (PII), and had an SSN verified by the Social Security Administration (SSA) Enumeration Verification System. CMS provided the person summary and claims files from MAX for linkage-eligible participants with SSA-verified SSNs that matched. A 2015 NCHS report provided information on the linkage and MAX files, including match rates (1).

The NCHS Ethics Review Board (ERB) approved the data linkage of NHIS files with MAX files. No additional ERB approval was required by NCHS for this analysis. The linked NHIS–MAX files are restricted use and available to users in the NCHS Research Data Center.

For the 1999–2005 NHIS, the survey years for this analysis, the percentage of persons eligible for linkage in the whole sample ranged from 56.2% in 2002 to 45.3% in 2005 with an overall linkage to MAX of 13.6% to 16.5%, respectively (3) (Table 4).

Target sample

The target sample comprised children aged 0–4 years born 1999–2001 and enrolled in Medicaid at birth at the time of the 1999–2005 NHIS interview. Selecting these years of MAX data to identify Medicaid births ensured that the possible age range of the 1999–2005 NHIS child participants was 0–4 years. However, inpatient claims for childbirth are for the mother, not the child. Consequently, to identify children enrolled in Medicaid at birth, it was necessary to identify inpatient claims for childbirth from their mothers.

The sample of mothers comprised 1999–2005 NHIS linkage-eligible female participants aged 16–49 who lived in the same household of a 1999–2005 NHIS child aged 0–4 years (as indicated above), and were identified using the variable (MOTHER) from the record of the child’s mother available on NHIS. Mothers who were not linkage eligible (and their children), based on criteria described previously, were excluded

from this study. Dates recorded in MAX correspond to the beginning and ending dates of the hospital service for the claim; no specific date of birth is recorded. Because of this, and since the exact date of birth on NHIS was missing for nearly 10% of children during these survey years, linkage based on time of birth was performed as follows: Children were classified as enrolled in Medicaid at birth if their mothers successfully linked to a childbirth claim in the Medicaid MAX files, and the dates provided on that claim were consistent with a birth corresponding to the child's date of birth or age reported at the time of NHIS interview. Children whose mothers did not successfully link with a retrospective birth covered by Medicaid, for any reason, were classified as having a non-Medicaid covered birth. However, it is possible that some of these births may have been covered by Medicaid.

Demographic and health variables

Other than Medicaid status at birth, all sociodemographic and health-related data described in this report come from NHIS data in the linked file and were collected from an adult who was knowledgeable about the child within the Family Core questionnaire.

Sociodemographic factors included the race and Hispanic origin of the child (i.e., Hispanic, non-Hispanic white, non-Hispanic black, non-Hispanic other, or multiple-race groups) and poverty status defined using family income as a percentage of the federal poverty threshold from the family questionnaire (i.e., below 100%, 100%–149%, 150%–199%, and at or above 200% of the poverty threshold). Single imputations for race and Hispanic origin (https://www.cdc.gov/nchs/nhis/rhoi/rhoi_fa.q.htm) and multiple imputations for family income are included in NHIS data files and are used in this analysis (8,9). As states have varying income eligibility requirements, poverty status is particularly relevant to examining Medicaid coverage. Additional variables included maternal education (i.e., no high school diploma, high school diploma or General Educational Development high school equivalency diploma [GED], and

more than a high school education) and the child's age at the time of interview (i.e., 0, 1–2, and 3–4 years).

State of residence at the time of interview was classified according to the U.S. census region (i.e., Northeast, Midwest, South, and West) (9). Urban–rural classification of county of residence was based on the 2006 NCHS Urban–Rural Classification Scheme for Counties (10) as follows: large central metropolitan counties (counties in metropolitan statistical areas [MSAs] of 1 million or more population that contain the entire population of the largest principal city of the MSA, are completely contained in the largest principal city of the MSA, or contain at least 250,000 residents of any principal city of the MSA); large fringe metropolitan counties (counties in MSAs of 1 million or more population that do not qualify as large central); medium metropolitan counties (counties in MSAs of 250,000 to 999,999 population); and a combined category comprising small metropolitan counties (counties within MSAs comprising a population of 50,000–250,000), counties within micropolitan areas (areas of at least 10,000 but less than 50,000 population), and noncore counties (all other areas) (10). For tabulations, the combined category (small metropolitan, micropolitan, and noncore) is referred to as rural.

Health insurance coverage for the child at the time of NHIS interview was categorized as any private, public (including Medicaid, State Children's Health Insurance Program, and other government-based insurance), and none. The child's respondent-reported health status was categorized as excellent or very good, good, and fair or poor. The child having an unmet medical need due to cost in the last 12 months was assessed by the family respondent's answer to the following questions within the Family Core questionnaire: "During the past 12 months, has medical care been delayed for {person} because of worry about the cost?" and "During the past 12 months, was there any time when {person} needed medical care, but did not get it because {person} couldn't afford it?"

Analyses

Percentage estimates and corresponding 95% Clopper–Pearson confidence intervals are shown for all sociodemographic, geographic, and health variables.

Health status, health insurance, and unmet health care need due to cost were examined by the child and family demographic characteristics described above due to their known relationships with health and Medicaid enrollment (3,5,11) and by the geographic factors described above, as geography is known to be related to access to health care and sociodemographic factors, such as race and Hispanic origin (12). Chi-square tests were used to assess overall associations between child and family characteristics and health-related characteristics. Associations with statistical significance levels less than 0.05 were identified.

The child survey participant was the unit of analysis for all tabulations. While a mother may have multiple children in NHIS, maternal characteristics, such as educational attainment, are treated as other household-level characteristics, such as poverty status. Analyses do not account for the correlation of maternal characteristics between children belonging to the same household (approximately 5% of all identified eligible children, see [Results](#) and the [Figure](#)). Three children were missing information on family income, 20 were missing information on maternal education, and 7 were missing information on health insurance and were dropped from corresponding tabulations. A total of 31 children had addresses that could not be geocoded and were excluded from tabulations for region and urbanization.

Unless otherwise stated, all percentage estimates were weighted. The 1999–2005 NHIS sample weights for children were adjusted to account for missing Medicaid birth status for the children with mothers who were not linkage eligible. More specifically, the sample weights for children with Medicaid birth status were inflated to account for the sample weights for children with missing information on Medicaid birth status. A marginal calibration model with the child's race

and Hispanic origin, age, and sex was used. This model produced adjusted sample weights for the children with Medicaid birth status that approximate the original weighted distributions of these factors among all children. The sum of the adjusted sample weights is the same as the sum of the original sample weights.

SAS System for Windows, release 9.4 (SAS Institute, Inc., Cary, N.C.), and SUDAAN, release 11.0.1 (RTI International, Research Triangle Park, N.C.), were used for all analyses to account for the complex design of the sample. Design-based sample variances were estimated using Taylor series linearization.

Results

The Figure is a flowchart of the analytic sample selection process. Of the total 189,041 children aged 0–17 years who participated in the 1999–2005 NHIS, 20,649 were aged 0–4 years and born between 1999 and 2001. Using information collected about familial relationships during the family NHIS interview (4), a mother was identified in the household for 19,479 of these children. In total, 17,099 females aged 16–49 who participated in the 1999–2005 NHIS were identified in the survey as the biological mother of at least one of the 19,479 children. The 19,479 children were paired to the 17,099 mothers (mothers may have been paired to more than one child). The mother was linkage eligible in 10,687 of the 19,479 pairs (54.9%). Of these pairs for which the mother was linkage eligible, 2,492 children (23.3%) were born the same year that their mothers had a Medicaid-covered birth. As described previously, these children were classified as having been a Medicaid-covered birth. Of these, 134 mothers (5.0%) had more than one child represented in the 1999–2005 NHIS whose births were covered by Medicaid. The children in the remaining 8,195 pairs either had mothers who were not linked to the MAX files or were linked but did not have a Medicaid-covered birth in their birth year. These children are classified as not enrolled in Medicaid at birth or a non-Medicaid birth.

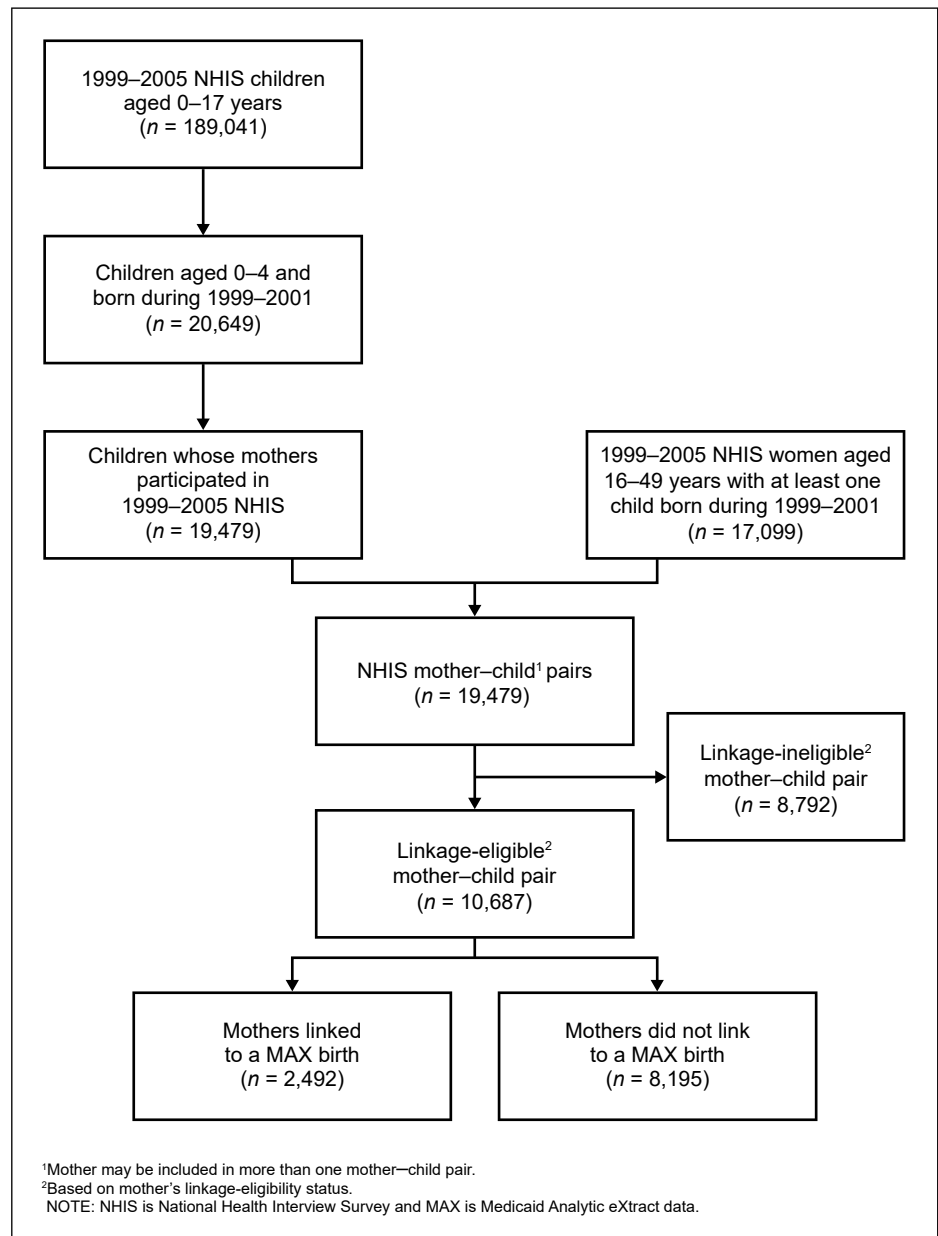


Figure. Analytic sample selection process to identify mothers with and without Medicaid births using the 1999–2005 National Health Interview Survey linked to 1999–2001

Demographic, geographic, and health variables

Among the children enrolled in Medicaid at birth, 20.0% were under 1 year of age, 42.5% were aged 1–2 years, and 37.4% were aged 3–4 years at the time of interview. Nearly one-half (48.8%) of the children were non-Hispanic white, 24.8% were non-Hispanic black, and 22.7% were Hispanic. At the time of interview, the majority of the children were below 200% of the federal poverty threshold (79.6%) and 45.2% were below 100%. Most children had mothers with no high

school diploma (40.1%), 30.0% had mothers with a high school diploma or GED, and 29.9% had mothers with more than a high school education. A total of 37.8% of the children lived in rural areas and 48.9% lived in the South (Table 1).

Seven in 10 children aged 0–4 years enrolled in Medicaid at birth were covered by public insurance at the time of interview (69.9%), 18.7% were covered by private health insurance, and 11.4% were uninsured (Table 1). The majority of children were reported to be in excellent or very good health (79.1%), 18.5% were reported to be in good health, and 2.4% were reported to be in fair or poor health

at the time of the interview (Table 1). One in 20 children had an unmet medical need due to cost at the time of interview (4.7%) (Table 1).

Health insurance coverage at the time of interview differed by the age of the child at the time of interview, race and Hispanic origin, poverty status, and maternal education. Health insurance coverage did not differ with the urban–rural classification of the county of residence, but it differed by region (Table 2).

Respondent-reported health status did not differ with the age of the child or region of residence at the time of the interview. However, it significantly differed by race and Hispanic origin, poverty status, maternal education, and the urban–rural classification of county of residence (Table 3).

Having an unmet need due to cost differed by maternal education but did not differ by the age of the child at the time of interview or the child’s race and Hispanic origin or poverty status (Table 4). In addition, unmet need due to cost was not associated with the region or the rural–urban classification of the county of residence (Table 4).

Discussion

This report illustrates how NHIS–MAX linked data can be used to identify Medicaid-covered births among children participating in a national health survey at 0–4 years of age. The report also investigates health outcomes using information collected in NHIS.

While NHIS and MAX data can be used separately to examine some health conditions for children in the Medicaid program, not all children who were covered by Medicaid at birth remain in Medicaid throughout childhood, and not all children in the Medicaid program at the time of survey participation were enrolled at birth. Importantly, NHIS undercounts Medicaid enrollment (4), does not capture retrospective Medicaid enrollment, or collect detailed information on health care delivered by Medicaid providers. MAX data are compiled for billing purposes and do not include information on risk factors related to health. Use of these linked

data expands the analytic capabilities of both files.

For illustration, this report describes three general health outcomes from NHIS for children who had a Medicaid-covered birth: health insurance status, general health status, and unmet health care need due to cost. With the additional linking of more recent NHIS data to earlier MAX files, health outcomes for older age groups, including outcomes more common among older children, could also be studied using this approach. While not included in this report, this approach can also be used to investigate later health-related outcomes among women participating in NHIS who had a Medicaid-covered birth. NHIS collects information on multiple household members, unlike other NCHS population health surveys, which enabled the identification of Medicaid coverage at birth for child survey participants, as described in this report. However, the collection of PII for linkage, linkage eligibility, and linkage algorithms change over time and should be considered when conducting similar analyses with later surveys and linkages (13).

The approach described in this report is subject to the following considerations: First, NHIS child participants were paired with women in the same household who had a birth documented in the MAX files corresponding to their date of birth. It is possible that some children had mothers with births covered by Medicaid but were not identified in the MAX files. Children with Medicaid-covered births who were not identified by NCHS’ procedures may include those covered by CHIP, children who were adopted or those from foster homes, and children with mothers who had inaccurate matching information. Second, Medicaid birth status could not be determined for children whose mothers were not linkage eligible (mothers who were not linkage eligible could not be linked to MAX files). Incomplete data due to linkage ineligibility may lead to biased estimates. Although the children’s sample weights for the tabulations in this report were calibrated to approximate national age, race and Hispanic origin, and sex distributions among children for these survey years, there could be

other factors related to the availability of Medicaid birth status, which was based on the mother’s linkage eligibility and not included in the adjustment model that could affect the inferences; other approaches for adjusting weights or analyzing data to address this potential bias could be used. Third, since income eligibility requirements for Medicaid receipt vary by state, Medicaid eligibility does not apply uniformly among those selected at the national level to participate in the survey, and mothers may or may not have met the requirements for Medicaid eligibility at the time of birth, depending on the state in which the birth occurred. As a result, some of the children who were not identified as enrolled in Medicaid at birth may have been enrolled in Medicaid had their mothers lived in a different state based on income eligibility requirements. As with other analyses of MAX data, these state differences could affect some research questions addressed by the linked NHIS–MAX data.

In summary, NHIS–MAX linked data may be used to assess relationships between health status and Medicaid coverage at birth among children sampled in NHIS. This data source could be used for analyses that may inform policy analysts and others who are interested in data that allow examination of the health of children and mothers after a Medicaid-covered birth. With additional years of linked NHIS data, this analysis could provide an example for future assessment of health outcomes for children enrolled in Medicaid at birth during 1999–2001 as the children grow older.

References

1. Golden C, Driscoll AK, Simon AE, Judson DH, Miller EA, Parker JD. Linkage of NCHS population health surveys to administrative records from Social Security Administration and Centers for Medicare & Medicaid Services. *National Center for Health Statistics. Vital Health Stat 1*(58). 2015.
2. Martin JA, Hamilton BE, Osterman MJK, Driscoll AK, Drake P. Births: Final data for 2016. *National Vital Statistics Reports*; vol 67 no 1. Hyattsville, MD: National Center for Health Statistics. 2018.

3. Simon AE, Driscoll A, Gorina Y, Parker JD, Schoendorf KC. A longitudinal view of child enrollment in Medicaid. *Pediatrics* 132(4):656–62. 2013.
4. Mirel LB, Simon AE, Golden C, Duran CR, Schoendorf KC. Concordance between survey report of Medicaid enrollment and linked Medicaid administrative records in two national studies. *National Health Statistics Reports*; no 72. Hyattsville, MD: National Center for Health Statistics. 2014.
5. Lloyd PC, Simon AE, Parker JD. Characteristics of children in Medicaid managed care and Medicaid fee-for-service, 2003–2005. *National Health Statistics Reports*; no 80. Hyattsville, MD: National Center for Health Statistics. 2015.
6. Botman SL, Moore TF, Moriarity CL, Parsons VL. Design and estimation for the National Health Interview Survey, 1995–2004. *National Center for Health Statistics. Vital Health Stat* 2(130). 2000.
7. Centers for Medicare & Medicaid Services. Medicaid Analytic eXtract (MAX) general information. Available from: <https://www.medicaid.gov/medicaid/data-and-systems/macbis/max/index.html>.
8. Schenker N, Raghunathan TE, Chiu P-L, Makuc DM, Zhang G, Cohen AJ. Multiple imputation of missing income data in the National Health Interview Survey. *J Am Stat Assoc* 101(475):924–33. 2016.
9. U.S. Census Bureau. Census regions and divisions of the United States. Available from: https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf.
10. Ingram DD, Franco SJ. 2013 NCHS urban–rural classification scheme for counties. *National Center for Health Statistics. Vital Health Stat* 2 (166). 2014.
11. Heck KE, Parker JD. Family structure, socioeconomic status, and access to health care for children. *Health Serv Res* 37(1):173–86. 2002.
12. National Center for Health Statistics. *Health, United States, 2001 with urban and rural health chartbook*. Hyattsville, MD. 2001.
13. Miller DM, Gindi RM, Parker JD. Trends in record linkage refusal rates: Characteristics of National Health Interview Survey participants who refuse record linkage. Presented at: Joint Statistical Meeting. Miami, FL: American Statistical Association. 2011.

Table 1. Percent distribution of child and family characteristics of children with Medicaid-covered births at the time of interview, 1999–2005

Characteristic	Percent ¹	95% confidence interval	
		Lower	Upper
Age (years)			
0	20.0	18.4	21.8
1–2	42.5	40.4	44.7
3–4	37.4	35.3	39.6
Race and Hispanic origin			
Hispanic	22.7	20.5	25.1
Non-Hispanic white	48.8	45.9	51.7
Non-Hispanic black	24.8	22.5	27.2
Non-Hispanic other	3.7	2.8	4.8
Poverty status as a percentage of poverty threshold			
Less than 100%	45.2	43.0	47.5
100%–149%	21.2	19.4	23.1
150%–199%	13.2	11.8	14.8
200% and greater	20.4	18.5	22.4
Maternal education			
No high school diploma	40.1	37.9	42.4
High school or GED	30.0	28.0	32.0
More than high school education	29.9	27.8	32.1
Urban–rural classification of county of residence²			
Large central metropolitan	24.2	21.8	26.7
Large fringe metropolitan	14.9	13.0	17.0
Medium metropolitan	23.2	19.8	26.9
Rural	37.8	33.9	41.8
U.S. census region			
Northeast	14.0	12.0	16.3
Midwest	23.0	20.6	25.7
South	48.9	46.1	51.8
West	14.0	12.6	15.5
Health insurance coverage			
Private	18.7	16.8	20.7
Public	69.9	67.6	72.2
Uninsured	11.4	10.0	13.0
Respondent-reported health status			
Very good or excellent health	79.1	77.2	80.9
Good	18.5	16.8	20.3
Fair or poor	2.4	1.8	3.2
Unmet medical need due to cost	4.7	3.9	5.7

¹Percentages may not add to 100 due to rounding.

²2013 National Center for Health Statistics Urban–Rural Classification Scheme for Counties (see reference 10 in the report).

NOTES: Child and family variables were obtained from the National Health Interview Survey (NHIS) at the time of interview. GED is General Educational Development high school equivalency diploma.

SOURCE: 1999–2004 NHIS linked to Medicaid Analytic eXtract data.

Table 2. Child and family characteristics of children with Medicaid-covered births, by child's health insurance status at the time of interview, 1999–2005

Characteristic	Private health insurance	95% confidence interval		Public health insurance	95% confidence interval		No health insurance	95% confidence interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Age (years)¹									
0	13.6	10.1	18.1	77.7	73.0	81.7	8.7	6.5	11.5
1–2	18.0	15.4	20.8	70.3	66.6	73.7	11.8	9.6	14.4
3–4	21.3	18.1	24.8	66.9	63.1	70.4	11.9	9.5	14.7
Race and Hispanic origin¹									
Hispanic	12.9	10.0	16.5	70.1	65.6	74.2	17.0	13.9	20.7
Non-Hispanic white	22.5	19.6	25.6	67.5	64.1	70.6	10.1	8.2	12.3
Non-Hispanic black	14.2	11.5	17.5	78.8	75.1	82.0	7.0	5.1	9.4
Non-Hispanic other	24.8	12.2	41.7	56.9	39.3	73.4	18.3	8.8	31.7
Poverty status as a percentage of poverty threshold¹									
Less than 100%	4.9	3.6	6.4	85.8	83.2	88.0	9.4	7.5	11.6
100%–149%	15.0	11.7	19.1	72.3	66.9	77.1	12.7	9.6	16.6
150%–199%	26.2	21.1	32.0	59.3	53.1	65.3	14.5	10.9	19.1
200% and greater	46.9	41.9	52.0	41.6	36.9	46.4	11.5	8.5	15.4
Maternal education¹									
No high school diploma	9.8	7.9	12.1	76.4	73.1	79.5	13.7	11.3	16.7
High school or GED	20.5	17.3	24.2	70.0	66.1	73.6	9.5	7.2	12.4
More than high school education	27.3	23.5	31.5	63.7	59.7	67.5	9.0	6.9	11.6
Urban–rural classification of county of residence²									
Large central metropolitan	17.1	13.7	21.1	70.6	66.0	74.8	12.4	9.5	15.9
Large fringe metropolitan	24.0	18.9	29.9	66.0	60.5	72.1	9.5	6.4	13.4
Medium metropolitan	15.7	12.4	19.7	74.8	69.8	78.3	10.0	7.2	13.4
Rural	18.7	15.7	22.2	69.5	65.5	73.2	11.8	9.6	14.6
U.S. census region¹									
Northeast	15.8	11.3	21.5	77.1	70.7	82.5	7.1	4.5	10.5
Midwest	22.3	18.5	26.5	69.0	64.7	73.0	8.8	6.2	12.0
South	17.3	14.7	20.1	70.9	67.0	73.6	12.4	10.2	14.9
West	18.7	14.0	24.4	66.2	59.9	72.0	15.1	11.4	19.8

¹Statistically significant association between health insurance coverage at the time of interview and characteristic ($p < 0.05$).

²2013 National Center for Health Statistics Urban–Rural Classification Scheme for Counties (see reference 10 in the report).

NOTES: Child and family variables were obtained from the National Health Interview Survey (NHIS) at the time of interview. GED is General Educational Development high school equivalency diploma.

SOURCE: 1999–2004 NHIS linked to Medicaid Analytic eXtract data.

Table 3. Child and family characteristics of children with Medicaid-covered births, by reported health status at the time of interview, 1999–2005

Characteristic	Excellent or very good	95% confidence interval		Good	95% confidence interval		Fair or poor	95% confidence interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Age (years)									
0	79.8	75.6	83.5	18.0	14.5	22.1	2.2	1.1	3.9
1–2	78.5	75.8	81.0	18.7	16.5	21.2	2.8	1.8	4.1
3–4	79.4	76.2	82.3	18.5	15.6	21.6	2.1	1.2	3.4
Race and Hispanic origin¹									
Hispanic	77.4	73.8	80.6	20.2	17.1	23.7	2.4	1.3	4.1
Non-Hispanic white	82.9	79.9	85.6	15.8	13.1	18.9	1.3	0.7	2.2
Non-Hispanic black	73.5	70.2	76.6	22.3	19.5	25.4	4.2	2.7	6.1
Non-Hispanic other	76.7	64.5	86.3	18.0	9.6	29.5	5.3	1.2	14.5
Poverty status as a percentage of poverty threshold¹									
Less than 100%	74.7	71.6	77.5	22.0	19.4	24.8	3.4	2.3	4.8
100%–149%	77.2	73.0	81.0	19.3	15.8	23.4	3.5	2.0	5.5
150%–199%	82.9	77.6	87.1	16.3	12.1	21.5	0.9	0.2	2.6
200% and greater	88.5	84.6	91.4	11.4	8.5	15.2	0.2	0.0	1.1
Maternal education¹									
No high school diploma	74.3	71.1	77.2	22.9	19.9	26.1	2.8	1.9	4.1
High school or GED	79.4	75.7	82.6	18.3	15.2	21.9	2.3	1.3	3.7
More than high school education	85.6	82.7	88.1	12.6	10.2	15.6	1.8	0.9	3.1
Urban–rural classification of county of residence^{1,2}									
Large central metropolitan	76.0	72.3	79.3	20.5	17.6	23.9	3.5	1.9	5.9
Large fringe metropolitan	84.1	79.3	88.0	14.1	10.4	18.8	1.8	0.7	4.0
Medium metropolitan	75.0	70.2	79.3	23.0	19.0	27.6	2.0	1.0	3.5
Rural	81.3	78.1	84.0	16.5	13.8	19.5	2.3	1.3	3.6
U.S. census region									
Northeast	78.9	73.7	83.3	17.3	13.0	22.6	3.8	1.6	7.6
Midwest	77.4	73.0	81.3	20.2	16.6	24.3	2.4	1.2	4.3
South	79.9	77.1	82.4	18.1	15.7	20.8	2.0	1.3	3.0
West	78.2	73.6	82.2	19.3	15.4	23.9	2.5	1.1	4.8

¹Statistically significant association between health status at the time of interview and characteristic ($p < 0.05$).

²2013 National Center for Health Statistics Urban–Rural Classification Scheme for Counties (see reference 10 in the report).

NOTES: Child and family variables were obtained from the National Health Interview Survey (NHIS) at the time of interview. GED is General Educational Development high school equivalency diploma.

SOURCE: 1999–2004 NHIS linked to Medicaid Analytic eXtract data.

Table 4. Child and family characteristics of children with Medicaid-covered births, by unmet health care need due to cost at the time of interview, 1999–2005

Characteristic	Unmet need	95% confidence interval		No unmet need	95% confidence interval	
		Lower	Upper		Lower	Upper
Age (years)						
0	3.0	1.7	4.9	97.0	95.2	98.3
1–2	5.0	3.6	6.6	95.0	93.4	96.4
3–4	5.4	3.9	7.2	94.6	92.8	96.1
Race and Hispanic origin						
Hispanic	4.5	2.9	6.6	95.5	93.4	97.1
Non-Hispanic white	5.3	3.9	6.9	94.7	93.1	96.1
Non-Hispanic black	3.8	2.5	5.6	96.2	94.4	97.5
Non-Hispanic other	5.3	0.8	16.9	94.7	83.1	99.2
Poverty status as a percentage of poverty threshold						
Less than 100%	4.5	3.2	6.1	95.5	94.0	96.8
100%–149%	4.5	2.9	6.7	95.5	93.3	97.1
150%–199%	7.0	4.4	10.4	93.0	89.6	95.6
200% and greater	4.1	2.3	6.6	95.9	93.4	97.7
Maternal education¹						
No high school diploma	4.4	3.1	6.1	95.6	93.9	96.9
High school or GED	3.3	2.1	5.0	96.7	95.0	97.9
More than high school education	6.7	4.9	8.9	93.3	91.1	95.1
Urban–rural classification of county of residence²						
Large central metropolitan	5.3	3.6	7.3	94.7	92.7	96.4
Large fringe metropolitan	6.4	4.1	9.5	93.6	90.5	95.9
Medium metropolitan	3.4	1.9	5.6	96.6	94.4	98.1
Rural	4.4	3.0	6.2	95.6	93.8	97.1
U.S. census region						
Northeast	2.8	1.2	5.5	97.2	94.5	98.8
Midwest	5.2	3.4	7.6	94.8	92.4	96.6
South	4.5	3.2	6.1	95.5	93.9	96.9
West	6.2	4.1	9.1	93.8	90.9	96.0

¹Statistically significant association between unmet health care need due to cost at the time of interview and characteristic ($p < 0.05$).

²2013 National Center for Health Statistics Urban–Rural Classification Scheme for Counties (see reference 10 in the report).

NOTES: Child and family variables were obtained from the National Health Interview Survey (NHIS) at the time of interview. GED is General Educational Development high school equivalency diploma.

SOURCE: 1999–2004 NHIS linked to Medicaid Analytic eXtract data.

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