

**Ensuring Healthy Children:
The Effect of Health Insurance on Primary Health Care for Children**

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ABBREVIATIONS

ASEC	Annual Social and Economic
CDC	Center for Disease Control and Prevention
CHIP	State Children’s Health Insurance Program
CPS	Current Population Survey
FMAP	Federal Medical Assistance Percentage
FPL	Federal Poverty Level
IOM	Institute of Medicine
KCMU	Kaiser Commission on Medicaid and the Uninsured
LTM	Last Twelve Months
NCHS	National Center for Health Statistics
NHIS	National Health Interview Survey
PPACA	Patient Protection and Affordable Care Act
SCHIP	State Children’s Health Insurance Program

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ABSTRACT

Background Past studies have typically focused on the effect of health insurance on primary health care for children, but few have assessed the effect the type of health insurance coverage has on primary care. This research studied the effect of health insurance status—uninsured, private insurance, public coverage, or other insurance—on the accessibility, continuity, and comprehensiveness of primary health care for children.

Methods This research analyzed a sample of 39,225 children under 18 years of age from the 2006-2009 National Health Interview Survey, a nationally representative sample of households in the United States. The response rate for children was 75.2 percent. Logistic regression models were used to analyze the effect of health insurance on health status and three aspects of primary care: *accessibility* (physician visit; usual source of care; time since health professional visit), *continuity*, (usual source and site of care), and *comprehensiveness* (physical). Excellent or very good health status was the final dependent variable.

Results Compared to children with private health insurance, uninsured children and Medicaid or State Children’s Health Insurance Program (SCHIP) beneficiaries are 27% ($p<0.001$) and 89.4% ($p<0.01$) as likely, respectively, to have visited a physician within the last twelve months (LTM). Approximately 73% of uninsured children reported having a usual source of care, compared to 96% of children with private insurance and 98% of Medicaid/SCHIP beneficiaries. Children with private health insurance are at least twice as likely to report “excellent or very good” health as children with any other health insurance status ($p<0.001$). After controlling for the confounding effects of age, citizenship, mother’s education, father’s education, health status, poverty status, race/ethnicity, and region, Medicaid/SCHIP coverage is associated with similar, if not better, accessibility, continuity, and comprehensiveness of primary care compared to children with private insurance.

Conclusions Although by many indicators Medicaid and SCHIP enrollees have worse primary care than children with private health insurance, Medicaid and SCHIP beneficiaries are more likely to have risk factors that are associated with poorer primary care and poorer child health status. Nevertheless, clear relationships cannot be established to conclude how government health insurance programs perform relative to private insurance. Health insurance status is an important predictor, but not the only predictor, of the accessibility, continuity, and comprehensiveness of primary care. Other important risk factors include adolescence, non-U.S. citizenship, low levels of mother’s education, poverty, and residence in the West or South.

HEALTH CARE AND HEALTH INSURANCE

The Patient Protection and Affordable Care Act (PPACA) and Health Care and Education Reconciliation Act of 2010 transformed the American health care system and brought increased attention to government health insurance programs. While critics decry the expansion of government and increased spending, advocates claim that universal coverage is within sight. Government health insurance programs ostensibly aim to provide health care to children by insuring children, but health insurance coverage does not ensure quality health care. This study seeks to understand the effect, if any, of the type of health insurance coverage on primary health care for children in the United States.

One-sixth of Americans lack health insurance and 63.9 percent of the population has private health insurance. In 2009, the percentage of people covered by government health insurance rose to 30.6 percent, the highest rate since 1987 (DeNavas-Walt, Proctor, and Smith 2010).¹ Aside from Medicare, Medicaid is probably the most well-known of the government health insurance programs. Medicaid is a program jointly financed by the states and federal government to provide health insurance to eligible low-income Americans. Similar to Medicaid, the State Children's Health Insurance Program (SCHIP or CHIP) has been successful in reducing the number of uninsured children (KCMU 2010, "The Uninsured"). Just as health insurance is not equivalent to health care, not all health insurance is created equal.

PPACA will expand the role of government as a health insurance provider in order to reduce the number of uninsured. Past research has typically focused on the role of health

¹ Individuals can possess public and private insurance simultaneously. Thus, the total percentage of the population receiving health insurance from various sources does not sum to 100 percent.

insurance in general as a determinant of access to primary health care. Fewer studies have focused on how the type of health insurance determines the accessibility, continuity, and comprehensiveness of primary health care. This research divides health insurance status into four categories: uninsured, Medicaid/SCHIP, private insurance, and other public programs. The final category consists of children covered by Medicare, the Indian Health Services, and various state health insurance programs among others.

This research examines the role of health insurance in determining the accessibility, continuity, and comprehensiveness of primary health care for children and builds upon the research of Newacheck et al. (1998) and Stevens et al. (2006). Newacheck et al. (1998) found that access to primary health care is strongly associated with health insurance, but ignored the differences among types of health insurance. They found that uninsured children were much more likely than insured children to have a regular source of care or have had contact with a physician within the last year. Uninsured children were also more likely to have unmet health care needs. Controlling for health status, Stevens et al. (2006) found that higher risk profiles are associated with poorer primary care access and continuity, but greater comprehensiveness of care for children in California.

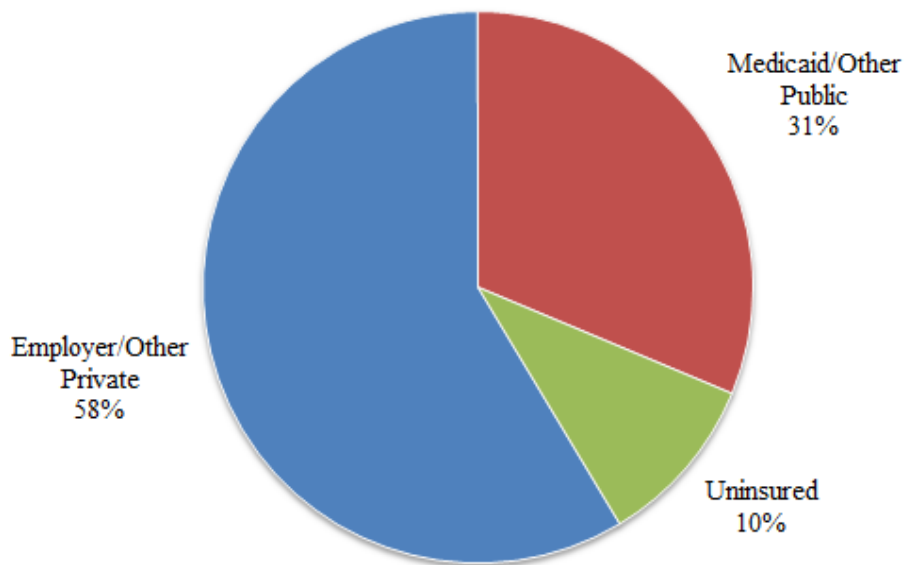
Similar to Stevens et al. (2006), this research subdivides health insurance into multiple distinct categories and looks at three aspects of primary care—access, continuity, and comprehensiveness of care. This research builds upon Newacheck et al. (1998) by examining the role of insurance as a determinant of access to primary care for children at the national level. These studies provide both the independent and dependent variables for this analysis. Because of the popular assumption that all children have access to emergency care because hospitals cannot

legally deny this type of care, primary care serves as the focus of this research. Thus, this research examines the effect of insurance status—defined as uninsured, Medicaid/SCHIP, private insurance, or other public programs—on the accessibility, continuity, and comprehensiveness of primary health care for children in the United States.

HEALTH INSURANCE FOR CHILDREN

In the United States, children receive health insurance from the private and public sectors. According to the Kaiser Commission on Medicaid and the Uninsured, private employer-based insurance covers 58% of all children. Public health insurance programs, mainly Medicaid and the State Children’s Health Insurance Program (SCHIP), are the next largest providers of health insurance in the United States. Public health insurance programs cover 31% of American children, including over half of low-income children. Uninsured children account for the remaining 10% of children (Figure 1).

Figure 1: Health Insurance Coverage of Children, 2008
78.7 Million Children



SOURCE: KCMU/Urban Institute analysis of 2009 ASEC Supplement to the CPS.

Medicaid and SCHIP Eligibility: The Federal Poverty Level

The federal poverty level (FPL) defines eligibility for Medicaid and SCHIP. Mollie Orshansky constructed the FPL in 1963 and 1964 based on the Department of Agriculture’s Economy Food Plan. The figure is three times the temporary nutritional needs of a family, but

this threshold probably underestimates the number of people in poverty (Vaughan 1993). Underestimation would reduce the number of people eligible for public health insurance programs whose eligibility requirements are set by the FPL, i.e., Medicaid and SCHIP.

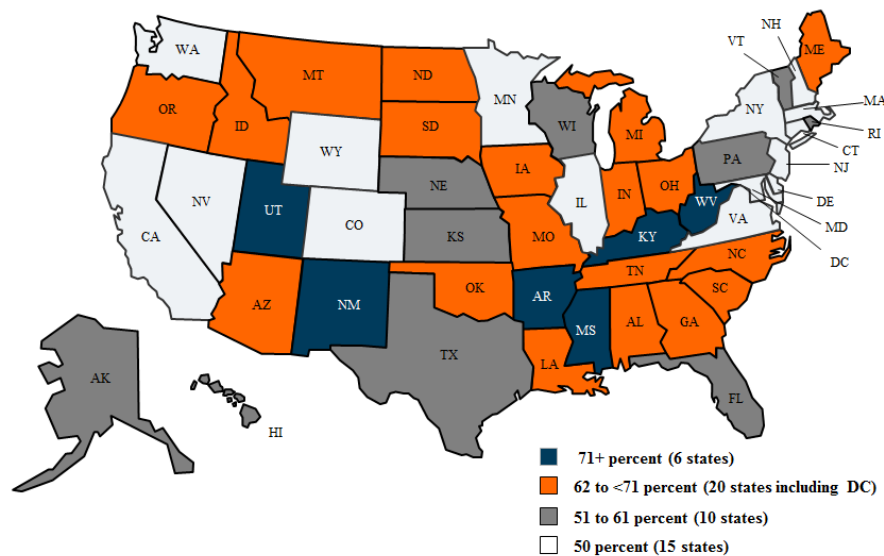
Medicaid

Enacted under title XIX of the Social Security Act in 1965, Medicaid offers public health insurance coverage to low-income children, their parents, pregnant women, the disabled, and the elderly. Medicaid requires states to cover children under 6 years old living in families with incomes at or below 133% of the federal poverty level (FPL) and children ages 6 to 18 living in families with incomes at or below 100% of the FPL. Many states have also expanded Medicaid income eligibility beyond the minimum FPL thresholds. Medicaid covered 29 million children at some point during 2007 (the most recent year of enrollment data available), making it the largest health insurance provider for children in the United States (KCMU 2010, “The Uninsured”).

Medicaid Financing and Cost

Administered at the state level, Medicaid is an open-ended entitlement program funded jointly by the states and the federal government. In 2006, Medicaid expenditures on nondisabled children totaled roughly \$31 billion in federal expenditures (Congressional Budget Office 2007). The federal government matches states’ spending using a matching rate, known as the federal medical assistance percentage (FMAP), which is based on each state’s per capita income relative to the national average. In 2010, the FMAP ranges from 50 percent to 76 percent (Figure 2).

Figure 2: Federal Medical Assistance Percentages (FMAP), FY 2010



SOURCE: Federal Register, February 2, 2010 (Vol. 75, No. 21), pp 5325-5328, at <http://frwebgate6.access.gpo.gov/cgi-bin/PDFgate.cgi?WAISdocID=985592272797+0+2+0&WAISaction=retrieve>.

Effectiveness of Medicaid

Medicaid expansions have displaced private health insurance at rates of approximately 50%, so Medicaid does not necessarily provide health insurance to children who would be uninsured otherwise (Cutler and Gruber 1996). Nevertheless, studies have shown that Medicaid expansions improved the health of white children, but results were unclear for blacks and Hispanics (Lykens and Jargowsky 2002). Many beneficiaries would not have health insurance without Medicaid. Beneficiaries are much poorer and less healthy than the privately insured low-income population. Medicaid enrollees are more likely to suffer from conditions that limit work and to be in fair or poor health (KCMU 2010, “The Uninsured”).

State Children’s Health Insurance Program (SCHIP)

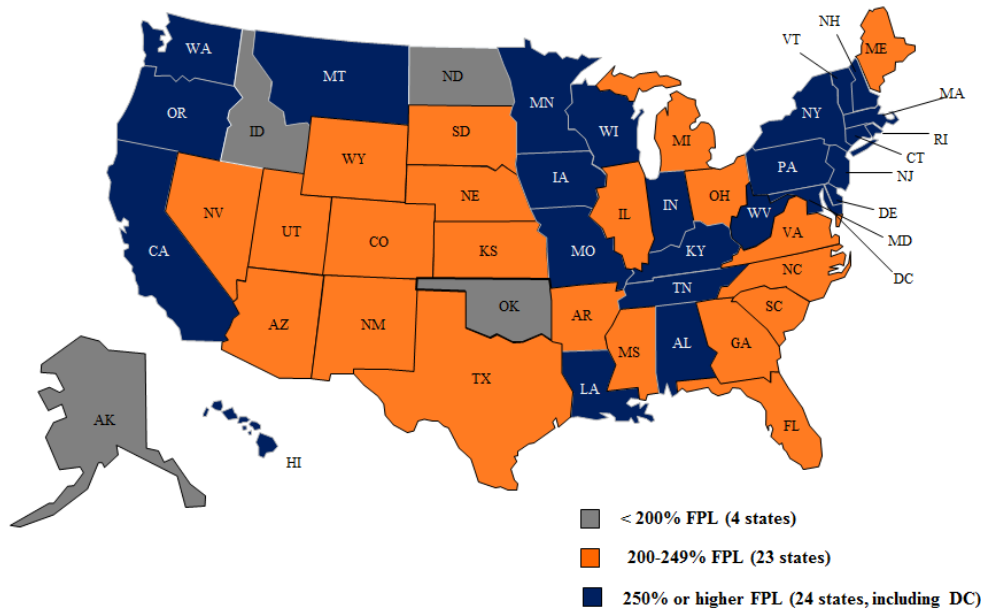
Enacted under title XXI of the Social Security Act as part of the Balanced Budget Act of 1997, SCHIP provides health insurance coverage to 6 million low-income children living in

families that are ineligible for Medicaid. In contrast to Medicaid, SCHIP was never designed as an entitlement. The program was designed to increase health insurance coverage among children without crowding out private insurance (Cunningham, Hadley, and Reschovsky 2002). Receiving a block grant program, states could decide whether to participate in SCHIP and, if so, at what level. SCHIP was purposely designed to appear more like a private plan to overcome some of the stigma normally associated with government programs (Kenney, Mann, and Salo 2005).

SCHIP State Variations

States were given tremendous discretion to design SCHIP programs based on three models. These included a Medicaid expansion above existing state eligibility criteria for children and their families; a separate, state-designed model similar to a private health insurance plan; or a combination of the two. Although states that chose to expand Medicaid could not cut off enrollment even if their federal allotment was fully spent, states creating a pseudo-private plan model were not required to insure children who tried to enroll after the allotment was spent (Demske 2006). As of 2007, twenty-four states used a combination model, eighteen used a separate-plans model, and eight states and the District of Columbia used a Medicaid-expansion model (Center for Medicaid and State Operations 2007). Like Medicaid, states set the upper bound income threshold that their SCHIP programs cover. Figure 3 shows the SCHIP income thresholds for each state as a percentage of the FPL.

Figure 3: Children’s Eligibility for Medicaid/SCHIP by Income, Dec. 2009



*The federal poverty line (FPL) for a family of three in 2009 is \$18,310 per year.
 **IL uses state funds to cover children above 200% FPL. MA uses state funds to 400% FPL.
 SOURCE: Based on a national survey conducted by Kaiser Commission on Medicaid and the Uninsured with the Center on Budget and Policy Priorities, 2009.

SCHIP Financing and Cost

Similar to Medicaid, states and the federal government jointly finance SCHIP. The federal government matches spending according to a formula that determines the matching rate. Unlike Medicaid, Congress sets annual federal funding for SCHIP at a fixed total amount. Over the course of 2006, SCHIP enrolled 6.7 million children at a total cost to the federal government of \$4.8 billion. The federal government matches states’ SCHIP spending at a higher rate than for Medicaid, ranging from 65 percent to 83 percent. Each state receives funding based on the number of children in low-income families, such children who are uninsured, and health care costs (Congressional Budget Office 2007).

States may also charge premiums and other fees to SCHIP enrollees. As of June 2009, thirty-six states require premiums or enrollment fees for SCHIP. The remaining fourteen states

and the District of Columbia do not require premiums or enrollment fees. Among those states charging fees, significant variation exists among state premium prices. Children in Connecticut with family incomes greater than 300 percent of the FPL pay between \$158-\$230 per child per month. Other states such as Maryland charge per family (KCMU 2010, “CHIP Enrollment”).

Effectiveness of SCHIP

Insurance coverage rates have increased among children since the passage of SCHIP, but SCHIP, like Medicaid, has also crowded out private health insurance. According to Dubay and Kenney (2004), insurance coverage among children increased 2.6% between 1999 and 2002. Cunningham, Hadley, and Reschovsky (2002) found that 38% of the increase in public coverage among low-income children was the result of substitution of public coverage for private insurance and that only about 10% of the increase in SCHIP enrollment reduced the number of uninsured children. Jonathan Gruber and Kosali Simon (2008) have found that crowd rates may be as high as 60%.

Although crowd-out rates may be large, Lave et al. (1998) found that SCHIP improved access to health care for children. At 12 months after enrollment, the proportion of children reporting delayed care or unmet need dropped from 57% to 16%. The proportion of children with a regular source of care increased from 89% to 99%, and 64% of children had seen a physician within the last six months, up from 59%.

Results at the state level have backed up the national findings. Szilagyi et al. (2004) showed that SCHIP increased access to and continuity of care at the state level by increasing the proportion of children with a usual source of care from 86% to 97% after 1 year of enrollment in

New York's SCHIP. Moreover, the proportion of children who used their usual source for most or all visits for health services increased from 47% to 89%.

Uninsured Children

Despite the existence of Medicaid and SCHIP, an additional 9.4 million children remain uninsured, and the vast majority of uninsured children are from low and middle income families (KCMU 2010, "CHIP Enrollment"). The uninsured are sicker and poorer than their insured peers (Hadley 2003). The uninsured are far more likely than those with insurance to report problems getting needed health care, and uninsured children are much more likely to lack a usual source of care. Uninsured children are also more likely to delay care or to have unmet medical needs than children with insurance. They are at higher risk for preventable hospitalizations and for missed diagnoses of serious medical conditions (KCMU 2010, "Health Coverage").

PRIMARY HEALTH CARE

Features of Primary Care

Although many definitions of primary care exist, general consensus exists over four features of primary care: accessibility, continuity, comprehensiveness, and coordination (Starfield 1994). Furthermore, the Institute of Medicine (1996) defines primary care as:

[I]ntegrated and accessible health care services; services provided by primary care clinicians—generally considered to be physicians, nurse practitioners, and physician assistants—but involving a broader array of individuals in a primary care team; accountability of clinicians and systems for quality of care, patient satisfaction, efficient use of resources, and ethical behavior; the majority of personal health care needs, which include physical, mental, emotional, and social concerns; a sustained partnership between patients and clinicians; and primary care in the context of family and community.

Hoffman and Paradise (2008) describe primary care as including “both preventive care and the treatment of routine illnesses and problems that do not require specialist care.”

Measures of Primary Care

Hoffman and Paradise (2008) identify reliable measures for access to care: a usual source of care, any contact with a health professional, preventive care visits, and any unmet perceived health care needs. A usual source of care also serves as a measure of continuity of care, and a routine physical serves as a measure of comprehensiveness of care (Stevens et al. 2006). Similar to Steven et al. (2006), Newacheck et al. (1998) analyze whether children have a usual source of care, the site of the usual source of care, type of care provided at the usual source, and indicators of delayed or missed care. Newacheck et al. (1998) also measure whether the child made contact with a physician within the last year and the number of such contacts as two measures of access to and use of primary care.

Usual Source of Care: Measures Accessibility and Continuity of Care

A usual source of care improves continuity of care and preventive care among other factors. Hoffman and Paradise (2008) describe having a usual source of care as one of the most common metrics of access to care and the “cornerstone of quality primary care.” Newacheck et al. (1998) and Stevens et al. (2006) use a usual source of care as one indicator for their analyses. Past research suggests that uninsured children are less likely to have a usual source of primary care than their insured counterparts (Hoffman and Paradise 2008).

Contact with a Health Care Professional: Access to Care

Bloom, Cohen, and Freeman (2009) found that more than three-quarters of children with Medicaid or private health insurance had contact with a physician or other health care professional within the past 6 months, compared to more than half of uninsured children. Thirteen percent of uninsured children had not had contact with a health care professional in more than 2 years, including those who never had contact, compared with 2% for children with private insurance coverage. Hoffmann and Paradise (2008) found that 26% of uninsured children had not seen or talked to a health care professional within the last year, compared to 8% of children covered by Medicaid or private insurance.

Excellent or Very Good Health: Actual Goal

Stevens et al. (2006) also evaluates health status as a measure of primary care. Ostensibly, effective medicine keeps healthy children healthy and helps sick children get well. Using the standard Likert-type five-category “excellent, very good, good, poor, or fair” scale, they found that uninsured Californian children were 83% ($p < .001$) as likely to have “excellent” or “very good” health when compared to children with private insurance. Californian Medicaid

beneficiaries were 87% ($p < .001$) as likely to have excellent or very good health when compared to children insured privately.

METHODS

Past studies have usually compared insured and uninsured children to focus on the role of insurance coverage as a determinant of children's access to and use of primary care (Newacheck et al. 1998; Devoe et al. 2008). Fewer studies have attempted to determine the influence of the type of insurance on the use of primary care by children (Stevens et al. 2006; Hoilette et al. 2009). This research compares four categories of health insurance status—uninsured children, children covered by Medicaid or SCHIP, children with private health insurance, and children with “other” insurance—to examine the role of health insurance status on the accessibility, continuity, and comprehensiveness of primary health care. “Other” forms of insurance include Medicare, Indian Health Services, and state health insurance programs among others.

Source of Data

The National Health Interview Survey (NHIS) is a multi-purpose health survey conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). Produced every year since 1957, the NHIS uses a multistage sample and serves as the principal source of information on the health of the American civilian, noninstitutionalized, household population and served as the basis for the Newacheck et al. (1998) study and others (Hoilette 2009; Bloom, Cohen, and Freeman 2009; Ettner 1996). The NHIS dataset does not include children not living in households, such as homeless and institutionalized children. The sample includes design, ratio, non-response and post-stratification adjustments for sample children. National estimates of all sample child variables can be made using these weights. Public use microdata files are released on an annual basis and serve as the basis for this study (NCHS 2010).

The NCHS implemented a new NHIS sample design in 2006, but the basic structure of the new 2006 NHIS sample design is very similar to the previous 1995-2005 NHIS sample design. In 2003, the NHIS began using weights based off the 2000 United States Census population estimates. Compared to the 1997-2005 sample, the NCHS permanently reduced the 2006-2009 sample by 13%. Similar to the 1997-2005 NHIS, the design oversamples Asians, blacks, and Hispanics. State-level stratification is also maintained (NCHS 2010). Years 2006 to 2009 utilize a consistent sample design, but the change in sample design should be considered when comparing this data to NHIS from 2005 and before (NCHS 2010).

The 2006-2009 NHIS serve as the basis of this analysis. Year 2006, when the new sample design was implemented, will serve as the starting point. Year 2009 provides the most recent data. Child-level, person-level, and family-level files were merged to form the model. The NHIS 2006-2009 contained 39,225 observations for this analysis, but children whose insurance status was unknown (N=175) were excluded. The final dataset included 39,040 children under the age of 18. An adult member of the household responded for the children used in the NHIS. After taking into account the household and family non-response rates, the sample child response rate for years 2006-2009 was 75.2%. Without taking household and family non-response rates into account, the sample child response rate was 88.7%.² Each dependent variable used in this analysis has a nonresponse rate less than 10 percent.

² The NHIS survey refers to these rates as the “Final Sample Child Response Rate” and “Conditional Sample Child Response Rates,” respectively (NCHS 2010). The Conditional Sample Child Response Rate is calculated by dividing the number of completed Sample Child interviews (39,225) by the total number of eligible sample children (44,218). Of the 39,225 children interviewed, 175 had unknown insurance status, reducing the sample to 39,040 children.

Analytic approach

A multivariate logistic regression was used to compare the accessibility, continuity, and comprehensiveness of primary care among uninsured children, children insured by Medicaid or SCHIP, children insured privately, and children with “other” insurance. The regression was weighted to account for NHIS clustering, stratification, and oversampling of specific population subgroups. Similar to Newacheck et al. (1998), the research analyzes the NHIS data to compare access to primary care for uninsured and insured children. This research further subdivides insured children into children insured by Medicaid or SCHIP, children insured privately, and children with other public insurance. Because this research primarily aims to evaluate the differences, if any, between private insurance and Medicaid/SCHIP, the 367 overlapping observations for private and Medicaid/SCHIP were coded as insured by Medicaid or SCHIP. Thus, coverage for any reason by Medicaid and SCHIP was considered “public” coverage.³

Independent Variables

Health insurance status was divided into four categories: uninsured, private health insurance, Medicaid or SCHIP, and other. To ease readability and comparability with the Appendix, the specific variable names have been included. The NHIS classifies uninsured children using the “notcov” FinalDocName Code (see the Appendix). Medicaid (“medicaid”) and SCHIP (“schip”) were combined into one category because of the similarities of these programs. The NHIS’s “private” variable identified children with private health insurance. The

³ These 367 overlapping observations may be children with Medicaid/SCHIP coverage and a single service plan, e.g., a plan only covering dental care. Among children with a single service plan, there are 9,241 overlaps with private coverage and 1,294 overlaps with Medicaid/SCHIP coverage, both types of coverage are as defined by this research.

remaining children were considered to have other insurance, which includes those with state health insurance programs aside from SCHIP or Indian Health Service coverage among others.

Similar to Stevens et al (2006), the logistic regression analysis was used to control for the possible confounding effects of age, mother's education, father's education, health status, poverty status, and race. Race was categorized as non-Hispanic Asian, non-Hispanic black, Hispanic, non-Hispanic white, and other. Poverty status was divided into poverty bands of less than 100 percent of the federal poverty level (FPL), 100-199 percent of the FPL, and 200 percent or more of the FPL.⁴ Following Stevens et al. (2006), each parent's education was coded as less than high school, high school graduate, some college, or college degree or higher. Age was divided into children 0-11 and adolescents 12-17.⁵ Health status responses were categorized as "excellent or very good," "good," or "fair or poor." Similar to Newacheck et al. (1998), this study controls for region. Citizenship status was also included as a control. See the Appendix for specific 2006-2009 NHIS variable codes.

The original model included family structure, family size, language spoken at home, birthplace, and gender, but these stratifications were removed. Family structure and family size were dropped due to collinearity. Language was dropped because it was only statistically significant for Spanish-speakers getting physicals within the LTM ($p < 0.10$). Similar to Stevens et al. (2006), birthplace was included to approximate for immigration status. Because the NHIS data includes citizenship information and birthplace correlated highly with citizenship (Pearson

⁴ Stevens et al. (2006) provides unique poverty bands for 200-299 percent of the FPL and more than 300 percent of the FPL. However, limitations of the NHIS dataset prevented this division.

⁵ Stevens et al. (2006) defines adolescents as aged 12 to 19. The NHIS data considers children to be younger than 18, so individuals age 18 or 19 are considered adults for the purpose of this study.

correlation coefficient=0.828), the birthplace variable was dropped. Gender was not statistically significant for any of the tests.

Dependent Variables

Like Stevens et al. (2006), this study reflects three of the four aspects of primary care: (1) access, (2) continuity, and (3) comprehensiveness. Access to primary care is measured by the presence of a usual source of care and the report of a physician visit within the past year. Unlike Stevens et al. (2006), this study focuses only on health care and does not assess dental care, so dental visits within the last year are excluded. Again, following Stevens et al. (2006), the presence or absence of a usual source of care also serves to approximate continuity of care. Comprehensiveness of care was assessed for children who had received routine physical exams within the last twelve months (LTM). Following Newacheck et al. (2009), the unmet health care needs of children due to cost were examined.⁶ Like Bloom, Cohen, and Freeman (2009), this research examines the duration of time since a child has last seen or talked to a health care professional. Because of the importance of a usual source of care for accessibility and continuity of care, the site of care was specifically examined (Newacheck et al. 1998). Finally, health status responses were dichotomized as “excellent or very good” or “good, fair, and poor” and used as a dependent variable (Stevens et al. 2006).

Analysis

This research used the survey procedures in STATA 11.1 to provide a nationally representative sample and to account for the complex sampling design of the NHIS. First, the

⁶ Newacheck et al. (1998) examines unmet health care needs due to any reason. However, limitations of the 2006-2009 NHIS prevent this analysis. Because more than 90% of the uninsured cite cost as the main barrier to getting care, unmet care due to cost serves as a reasonable substitute (Strunk and Cunningham 2002).

frequency of each confounding variable is stratified by insurance status (Table 1). Next, Table 2 displays the logistic regression analyses with and without controlling for confounding effects to highlight the cumulative effect of potential confounding factors. Dependent variables correspond to Stevens et al. (2006) and Newacheck et al. (1998) when applicable. Third, the important usual source of care indicator is presented with a frequency table of the usual site when a usual source of care is presence (Table 3). Fourth, Table 4 shows the duration of time since a child has had contact with a physician or other health care professional, stratified by insurance status, is assessed to provide another measure of access to care (Hoffmann and Paradise 2008). Fifth, Table 5 uses health status as a dependent variable with dichotomized responses of “excellent or very good” versus “good, fair, or poor” health (Stevens et al. 2006). Finally, the accessibility, continuity, and comprehensiveness of primary care are presented with multivariate logistic regression for the total sample (Table 6). All tables use 95 percent confidence intervals.

Table 1: Frequency of Confounding Factors

<i>Confounding Factors</i>	<i>% (SE)</i>				
	<i>Uninsured (N=3,934)</i>	<i>Medicaid/SCHIP (N=12,163)</i>	<i>Private (N=21,133)</i>	<i>Other (N=1,810)</i>	<i>Total Insurance (N=39,040)</i>
Age					
Children 0-11	8.83 (.050)	35.04 (.198)	51.31 (.362)	4.82 (.031)	64.13 (.640)
Adolescents 12-17	12.31 (.038)	24.22 (.074)	59.17 (.233)	4.30 (.015)	35.87 (.360)
Citizenship					
Non-US citizen	43.94 (.011)	23.78 (.006)	26.38 (.009)	5.90 (.001)	3.96 (.027)
US citizen	8.66 (.077)	31.48 (.266)	55.28 (.586)	4.58 (.044)	96.04 (.973)
Mother's Education (N=35,983)					
< High school	19.58 (.027)	56.75 (.078)	18.61 (.030)	5.06 (.007)	18.74 (.142)
High school graduate	10.95 (.025)	37.82 (.087)	46.18 (.124)	5.05 (.013)	25.00 (.248)
Some college	8.17 (.016)	30.39 (.056)	55.70 (.118)	5.75 (.012)	18.97 (.410)
College graduate	4.68 (.017)	11.66 (.040)	80.26 (.340)	3.39 (.013)	37.29 (.410)
Father's Education (N=27,133)					
< High school	21.87 (.029)	48.24 (.066)	25.72 (.042)	4.17 (.005)	18.80 (.143)
High school graduate	10.93 (.027)	26.57 (.064)	58.36 (.170)	4.15 (.011)	26.58 (.269)
Some college	7.80 (.012)	18.96 (.028)	67.24 (.113)	6.00 (.010)	15.73 (.163)
College graduate	4.07 (.015)	7.23 (.026)	85.26 (.372)	3.44 (.014)	38.89 (.426)
Health Status (N=39,033)					
Poor or fair	12.33 (.002)	59.50 (.010)	22.14 (.004)	6.04 (.000)	2.04 (.017)
Good	13.52 (.018)	45.37 (.062)	35.66 (.058)	5.45 (.008)	16.41 (.146)
Very good or excellent	9.33 (.068)	27.59 (.200)	58.65 (.533)	4.44 (.036)	81.55 (.838)
Poverty status (N=34,023)					
Less than 100% FPL	13.53 (.020)	72.10 (.115)	8.01 (.0149)	6.36 (.0105)	19.08 (.160)
100-199% of FPL	16.22 (.031)	49.97 (.099)	28.06 (.062)	5.75 (.0122)	22.60 (.205)
200% of FPL or higher	6.05 (.034)	9.84 (.054)	80.51 (.525)	3.60 (.021)	58.32 (.635)
Race/ethnicity					
Asian	7.55 (.003)	16.90 (.006)	70.72 (.032)	4.82 (.002)	6.00 (.044)
Black	7.57 (.011)	45.62 (.069)	40.80 (.063)	6.01 (.010)	17.77 (.153)
Hispanic	17.21 (.032)	45.49 (.083)	32.49 (.069)	4.82 (.010)	29.73 (.194)
Other	20.95 (.002)	37.71 (.004)	35.47 (.004)	5.87 (.000)	.092 (.011)
White	6.52 (.039)	17.92 (.1083)	71.63 (.427)	3.93 (.024)	45.59 (.598)
Region					
Northeast	5.64 (.009)	30.87 (.045)	58.81 (.116)	4.69 (.008)	16.99 (.177)
Midwest	7.26 (.015)	28.13 (.060)	61.17 (.148)	3.44 (.007)	20.15 (.231)
South	12.83 (.041)	32.26 (.106)	50.09 (.203)	4.82 (.019)	36.92 (.370)
West	11.26 (.022)	32.13 (.061)	51.35 (.129)	5.26 (.011)	25.94 (.223)

Note: These frequencies underestimate the actual population due to item nonresponse and unknowns, which are excluded from the tables.

RESULTS

Results Format: Adjusted Odds-Ratios and Significance Shading

Adjusted odds-ratios compare whether the probability of a certain event, i.e., dependent variable, is the same for a category of an independent variable relative to a reference category for the same independent variable, e.g., comparing the likelihood of children with Medicaid/SCHIP to have visited a physician within the last year relative to children with private health insurance. For example, Table 2 indicates that uninsured children are 0.27 times or 27% as likely as children with private health insurance to have visited a doctor within the last twelve months, without control for confounding effects ($p < 0.001$). Tables 2, 5, and 6 are also shaded to illustrate individual cells that were statistically significant. The darker the shading of each cell, the more statistically significant the independent or confounding variable was for that particular dependent variable. Shading also allows the reader to see which variables were statistically significant across dependent variables and to compare the relative importance of each confounding variable.

Physician Visit within the Last Twelve Months: Accessibility of Care

Table 2 shows that without controlling for confounding variables, uninsured children are 27% ($p < 0.001$) as likely to have visited a physician within the last twelve months (LTM) as children with private health insurance. Medicaid/SCHIP beneficiaries and children with other insurance were 89.4% ($p < 0.01$) and 85.0% ($p < 0.05$) as likely as privately insured children, respectively. After controlling for confounding variables, Medicaid and SCHIP beneficiaries are 1.418 ($p < 0.001$) times *more* likely to have visited a physician within the LTM than their privately insured counterparts. Thus, the confounding variables appear to have a large and statistically significant impact. Uninsured children also compared better to privately insured

children after controlling for confounding, and there appears to be little difference between private and other insurance.

Table 2: Indicators of Primary Health Care for Children, 2006-2009

Insurance Status	Adjusted Odds-Ratio (CI)			
	Physician Visit within LTM	Usual Source of Care	Physical within LTM	Unmet Care within LTM (Cost)
Insurance without Controls (ref: private)				
Uninsured	0.270 (0.247-0.294)***	0.065 (0.057-0.075)***	0.266 (0.243-0.290)***	13.033 (10.770-15.830)***
Medicaid/SCHIP	0.894 (0.827-0.965)**	0.696 (0.593-0.817)***	1.036 (0.973-1.102)	1.632 (1.309-2.034)***
Other insurance	0.850 (0.728-0.992)*	0.512 (0.366-0.717)***	1.041 (0.903-1.120)	1.417 (0.868-2.213)
Insurance with Controls (ref: private)				
Uninsured	0.431 (0.371-0.500)***	0.118 (0.093-0.150)***	0.389 (0.337-0.448)***	9.528 (6.888-13.180)***
Medicaid/SCHIP	1.418 (1.231-1.633)***	1.116 (0.834-1.492)	1.260 (1.123-1.413)***	1.173 (0.762-1.808)
Other insurance	1.057 (0.844-1.323)	0.709 (0.441-1.141)	1.202 (0.984-1.468)+	0.949 (0.497-1.811)
Note:	+ $p < 0.1$	* $p < 0.05$	** $p < 0.01$	*** $p < 0.001$

Usual Source of Care: Accessibility and Continuity of Care

Similar to physician visits within the LTM, privately insured children are more likely to have a regular source of care than those with other health insurance statuses (each at $p < 0.001$) before controlling for confounding variables. Without controls, uninsured children are 6.5% ($p < 0.001$) as likely; after controlling for confounding, uninsured children are 11.8% ($p < 0.001$) as likely to have a regular source of care when compared to children with private coverage. Importantly, there are no statistically significant differences among Medicaid/SCHIP, private coverage, and other insurance when controlling for confounding effects.

Physical Exam within the Last Twelve Months: Comprehensiveness of Care

Table 2 shows that uninsured children are 0.266 ($p < 0.001$) times as likely to have had a physical within the LTM as children with coverage before correcting for confounding. With controls, uninsured children’s comprehensive of care improves to 0.389 ($p < 0.001$) times as likely as children with private coverage. Without controlling for confounding, Medicaid/SCHIP, other

insurance, and private coverage appear to have little difference in comprehensiveness of care as measured through physicals within the LTM, but this relationship does not hold after controls are put in place. Children with Medicaid/SCHIP and other insurance are 1.260 ($p<0.001$) and 1.202 ($p<0.1$) times respectively *more* likely to have had a physical within the LTM when compared to children with private coverage.

Unmet Care Due to Cost within the Last Twelve Months: Access to Care

Relative to children with private coverage, children enrolled in Medicaid or SCHIP are 1.632 ($p<0.001$) times as likely to have had unmet health care needs due to cost within the LTM. Uninsured children are more than 13 ($p<0.001$) times as likely as children with private insurance to have had unmet health care needs due to cost within the past year (Table 2). These results do not hold after adjusting for age, citizenship, mother's education, father's education, health status, poverty status, race/ethnicity, and region. With these controls, there are no longer any statistical differences between children covered by private insurance and children enrolled in Medicaid or SCHIP. However, uninsured children are still more than 9.5 ($p<0.001$) times as likely as children with private insurance to have had unmet health care needs due to cost within the past year.

Site of Regular Care: Access to and Continuity of Care

Approximately 73 percent of uninsured children reported having a usual source of care, compared to 96% of children with private insurance and 98% of Medicaid/SCHIP beneficiaries (Table 3). Among children with a regular source of care ($N=36,645$), uninsured children were much more likely to use clinics, health centers, or emergency rooms as their regular source of care when compared to children with private insurance, Medicaid/SCHIP, or other insurance. Children with private insurance reported the lowest rates of clinic or health centers as their usual

source of care. When stratified by subgroup, the majority of children report a physician's office or HMO as their usual source of care. Uninsured children report hospital outpatient departments as the least used regular source of care. All other subgroups report emergency rooms as their least used regular source of care.

Table 3: Usual Source and Site of Care Among U.S. Children, 2006-2009

	With Usual Source of Care (N=38,971)	Usual Site of Care (N=36,645)				
		<i>Clinic or Health Center</i>	<i>Physician's Office or HMO</i>	<i>Hospital Outpatient Department</i>	<i>Emergency Room</i>	<i>Other</i>
Insurance Status		percent of group (95 percent confidence interval)				
<i>Uninsured</i>	72.9 (71.1-74.5)	36.2 (34.0-38.4)	56.6 (54.1-59.1)	2.1 (1.4-3.1)	3.9 (3.1-4.9)	1.2 (0.8-1.8)
<i>Medicaid/SCHIP</i>	96.6 (96.2-97.0)	33.5 (32.2-34.9)	64.1 (62.7-65.4)	1.6 (1.3-1.9)	0.7 (0.5-0.9)	0.2 (0.0-0.3)
<i>Private</i>	97.6 (97.4-97.9)	13.0 (12.2-13.8)	86.2 (85.4-87.0)	0.5 (0.3-0.6)	0.2 (0.1-0.2)	0.2 (0.2-0.3)
<i>Other</i>	95.5 (93.9-96.6)	37.8 (33.9-41.9)	56.6 (52.4-60.7)	3.9 (2.8-5.4)	0.8 (0.4-1.5)	0.9 (0.4-2.1)
<i>Total</i>	95.1 (94.8-95.4)	21.3 (20.5-22.2)	76.8 (75.9-77.7)	1.0 (0.9-1.2)	0.6 (0.5-0.7)	0.3 (0.2-0.4)

Note: Bolded cells are analyzed in Results.

Time Since Seen or Talked to Last Health Professional: Access to Care

Ninety-three percent of children covered by Medicaid/SCHIP or private insurance had seen or talked to a health professional within the LTM, but more than 80% of children with Medicaid or SCHIP have seen or talked to a health care professional within the past six months or less, compared to approximately 50% of uninsured children and 77% of children with private insurance (Table 4). Outside of this past year, children with Medicaid/SCHIP have experienced greater durations of time since they have last seen or talked to a health care professional compared to children with private coverage. Uninsured children are twice as likely to have never seen or talked to a health care professional as children with Medicaid/SCHIP and more than three times as likely as children with private coverage.

Table 4: Time Since Seen Last Health Professional (N=38,609)

	% (CI)					
	Never	6 months or less	More than 6 months, less than 1 year	More than 1 year, less than 2 years	More than 2 years, less than 5 years	More than 5 years
Insurance Status						
<i>Uninsured</i>	4.2 (3.4-5.1)	50.4 (48.4-52.4)	21.6 (20.2-23.0)	15.9 (14.5-17.5)	6.1 (5.3-6.9)	1.9 (1.5-2.5)
<i>Medicaid/SCHIP</i>	2.1 (1.7-2.5)	80.7 (79.9-81.6)	12.3 (11.7-12.0)	4.1 (3.7-4.5)	0.6 (0.5-0.8)	0.2 (0.1-0.3)
<i>Private</i>	1.2 (1.0-1.4)	77.2 (76.5-77.8)	15.8 (15.3-16.4)	4.8 (4.5-5.2)	0.9 (0.8-1.0)	0.1 (0.0-0.2)
<i>Other</i>	1.2 (0.7-1.9)	77.7 (75.1-80.1)	14.7 (12.6-17.2)	5.4 (4.4-6.7)	0.8 (0.5-1.5)	0.1 (0.0-0.6)
<i>Total</i>	1.7 (1.5-1.9)	75.8 (75.2-76.3)	15.3 (14.9-15.8)	5.6 (5.3-5.9)	0.3 (0.2-0.4)	0.3 (0.2-0.4)

Note: Bolded cells are analyzed in Results.

Health Status

Children with private health insurance are at least twice as likely to report “excellent or very good” health as children with any other health insurance status ($p<0.001$). This relationship holds after adjusting for confounding (Table 5), but the size of the disparity is reduced ($p<0.01$). With controls, uninsured children and children with Medicaid/SCHIP are 73.7% ($p<0.001$) and 63.8% ($p<0.001$) as likely, respectively, as children with private coverage to have excellent or good health. Because the region was not found to have a statistically significant effect as a confounding variable, the variable was excluded from the Table 5 analysis and the test repeated. Table 5 reflects the results of the repeated test.

Table 5: Health Status of Children, 2006-2009

<i>Variables</i>	<i>Adjusted Odds-Ratio (CI)</i> <i>Excellent or Very Good Health</i>
Insurance without Controls (ref: private)	
<i>Uninsured</i>	0.407 (0.369-0.450)***
<i>Medicaid/SCHIP</i>	0.328 (0.304-0.353)***
<i>Other insurance</i>	0.477 (0.400-0.568)***
Insurance with Controls (ref: private)	
<i>Uninsured</i>	0.737 (0.631-0.861)***
<i>Medicaid/SCHIP</i>	0.638 (0.549-0.741)***
<i>Other insurance</i>	0.7222 (0.582-0.897)**
Age (ref: children 0-11)	
Adolescents 12-17	0.743 (0.669-0.826)***
Citizenship (ref: US citizen)	
Non-US citizen	1.207 (0.994-1.465)+
Mother's Education (ref: < high school)	
High school graduate	1.236 (1.070-1.427)**
Some college	1.265 (1.076-1.486)**
College graduate	1.768 (1.506-2.076)***
Father's Education (ref: < high school)	
High school graduate	1.257 (1.100-1.436)**
Some college	1.474 (1.247-1.743)***
College graduate	1.694 (1.438-1.996)***
Poverty status (ref: 200% of FPL or higher)	
Less than 100% FPL	0.571 (0.482-0.676)***
100-199% of FPL	0.732 (0.636-0.843)***
Race/ethnicity (ref: white)	
Asian	0.657 (0.545-0.792)***
Black	0.683 (0.587-0.795)***
Hispanic	0.749 (0.661-0.848)***
Other	0.634 (0.393-1.023)+
Notes: +p<0.1 *p<0.05 **p<0.01 ***p<0.001	

Dependent Variable Mean: 0.815 (0.812-0.819)

Region was not significant for any category, so the variable was dropped and the analysis repeated.

Confounding Variables Analysis

Table 6 illustrates the importance of each confounding variable. Interestingly, the uninsured category of insurance was the only categorical variable that was significant at the $p<0.001$ level for all dependent variables (Tables 2, 5, and 6). Family income of 100-199% of the federal poverty level (FPL) was significant at least at the $p<0.01$ level for the five dependent variables analyzed in Tables 5 and 6. Family income less than 100% of the FPL was significant at least at the $p<0.01$ level. The remaining confounding variables are not statistically significant across the five dependent variables: excellent or very good health status, physician visit within the LTM, usual source of care, physical within the LTM, and unmet care due to cost within the LTM. The final dependent variable, unmet care due to cost, experiences noticeably different trends in which potential confounding variables are statistically significant.

Age. Compared to children ages 0-11, adolescents ages 12-17 have lower access to, continuity of, and comprehensiveness of primary care as measured by physician visits within the LTM, usual source of care, and a physical within the LTM, respectively. Age is statistically significant at the $p<0.001$ level for each of these dependent variables. Adolescents were between 0.538 to 0.743 times as likely as children to have reported each measure of primary care (Tables 5 and 6). However, age appears to have little effect on unmet care due to cost within the LTM.

Non-United States citizenship. Non-United States citizens are less likely to have seen a physician within the LTM, have a usual source of care, or have had a physical within the LTM compared to United States. These measures indicate that non-United States citizens have between 49% and 64.3% of the accessibility, continuity, and comprehensiveness of primary care of their United States citizen counterparts (each at $p<0.001$).

Table 6: Indicators of Primary Health Care for Children with Controls, 2006-2009

Variables	Adjusted Odds-Ratio (CI)			
	Physician Visit within LTM	Usual Source of Care	Physical within LTM	Unmet Care within LTM (Cost)
Insurance (ref: private)				
Uninsured	0.431 (0.371-0.500)***	0.118 (0.093-0.150)***	0.389 (0.337-0.448)***	9.528 (6.888-13.180)***
Medicaid/SCHIP	1.418 (1.231-1.633)***	1.116 (0.834-1.492)	1.260 (1.123-1.413)***	1.173 (0.762-1.808)
Other insurance	1.057 (0.844-1.323)	0.709 (0.441-1.141)	1.202 (0.984-1.468)+	0.949 (0.497-1.811)
Age (ref: children 0-11)				
Adolescents 12-17	0.620 (0.574-0.670)***	0.714 (0.613-0.832)***	0.538 (0.499-0.581)***	0.992 (0.777-1.268)
Citizenship (ref: US citizen)				
Non-US citizen	0.643 (0.541-0.765)***	0.490 (0.378-0.633)***	0.582 (0.486-0.696)***	1.223 (0.819-1.826)
Mother's Education (ref: < high school)				
High school graduate	1.260 (1.080-1.471)**	1.047 (0.824-1.331)	1.106 (0.966-1.265)	1.273 (0.888-1.824)
Some college	1.514 (1.281-1.789)***	1.732 (1.281-2.342)***	1.396 (1.221-1.596)***	1.380 (0.877-2.172)
College graduate	1.597 (1.360-1.875)***	1.723 (1.257-2.363)**	1.530 (1.325-1.766)***	0.928 (0.575-1.497)
Father's Education (ref: < high school)				
High school graduate	1.091 (0.950-1.254)	1.138 (0.885-1.447)	1.095 (0.955-1.254)	1.310 (0.945-1.816)
Some college	1.289 (1.097-1.515)**	1.071 (0.784-1.462)	1.155 (0.998-1.335)+	1.096 (0.690-1.742)
College graduate	1.459 (1.253-1.699)***	1.038 (0.775-1.391)	1.483 (1.288-1.708)***	1.115 (0.696-1.786)
Health Status (ref: excellent or very good)				
Poor or fair	2.180 (1.468-3.237)***	1.155 (0.703-1.899)	1.206 (0.889-1.637)	3.595 (2.143-6.033)***
Good	1.164 (1.028-1.318)*	1.236 (1.002-1.524)*	0.819 (0.732-0.916)*	1.955 (1.504-2.540)***
Poverty status (ref: 200% of FPL or higher)				
Less than 100% FPL	0.761 (0.642-0.901)**	0.492 (0.376-0.645)***	0.840 (0.717-0.984)*	1.543 (0.991-2.402)+
100-199% of FPL	0.795 (0.701-0.902)***	0.630 (0.501-0.791)***	0.819 (0.732-0.916)**	1.785 (1.297-2.455)***
Race/ethnicity (ref: white)				
Asian	0.797 (0.656-0.968)*	0.965 (0.717-1.299)	1.007 (0.856-1.184)	0.729 (0.422-1.261)
Black	0.753 (0.645-0.879)***	0.841 (0.629-1.124)	1.465 (1.286-1.669)***	0.777 (0.549-1.101)
Hispanic	0.881 (0.771-1.006)+	0.883 (0.696-1.120)	1.230 (1.087-1.391)**	0.811 (0.578-1.139)
Other	1.146 (0.697-1.886)	1.093 (0.472-2.526)	1.107 (0.726-1.689)	0.576 (0.131-2.521)
Region (ref: Northeast)				
Midwest	0.589 (0.501-0.693)***	0.665 (0.469-0.945)*	0.399 (0.343-0.464)***	1.603 (0.925-2.779)+
South	0.564 (0.484-0.657)***	0.447 (0.324-0.616)***	0.374 (0.322-0.434)***	2.184 (1.288-3.705)***
West	0.419 (0.354-0.497)***	0.417 (0.302-0.576)***	0.350 (0.300-0.407)***	2.217 (1.314-3.741)***
Note:	+p<0.1	*p<0.05	**p<0.01	***p<0.001
Dependent Variable Mean:	0.792 (0.788-0.796)	0.943 (0.941-0.946)	0.741 (0.737-0.745)	0.028 (0.026-0.030)

Parental education. Higher levels of parental education are associated with healthier children (Table 5). Children with more educated parents are also more likely to have visited a physician within the past year, have a usual source of care, and have had a physical within the LTM (Table 6). However, children whose parents are more educated have no significant difference in the incidence of unmet care due to cost. Higher levels of education for the mother

are associated with larger positive effects on the accessibility, continuity, and comprehensiveness of primary care for children than comparable levels of education for the father.

Health status. Children with private health insurance are more likely to have excellent or very good health as compared to children with Medicaid/SCHIP, other insurance, or uninsured children (Table 6). As a control variable, the health status of a child has a mixed impact on his or her primary care. Compared to children with “excellent or very good” health, the research indicates that children with “poor or fair” health are 2.18 ($p<0.001$) times as likely to have had a physician visit within the LTM but 3.595 ($p<0.001$) times as likely to have had unmet care due to cost within the LTM. These two measures of accessibility are highly significant, but in opposite directions. Also, the children with poor or fair health do not appear to have less continuity or comprehensiveness of care—as measured by having a usual source of care or having had a physical within the LTM—compared to children with excellent or very good health. The effect of “good” health on children’s primary care is also unclear.

Race/ethnicity. The effect of race on primary care is unclear. Non-white children are less likely to be in excellent or very good health compared to white children (Table 5). Compared to non-Hispanic white children, Non-Hispanic Asian children are 65.7% ($p<0.001$) as likely to have excellent or good health, non-Hispanic black children 68.3% ($p<0.001$) as likely, and Hispanic children 74.9% ($p<0.001$) as likely. However, the four dependent variables of Table 6 indicate a less clear relationship between race and primary care. Non-white children are less likely to have visited a doctor within the past year ($p<0.1$ or less), but the research indicates little relationship between having a usual source of care or the incidence of unmet care due to cost for non-white children compared to white children.

Region. As noted previously, region as defined by the United States Census Bureau was dropped from the Table 5 analysis due to not being statistically significant. The four dependent variables of Table 6 indicate that children from the Northeast experience the greatest accessibility, continuity, and comprehensiveness of care with the lowest incidence of unmet care due to cost, followed by children from the Midwest, South, and West. Children from the West were the least likely to have visited a physician within the LTM, have a usual source of care, or have had a physical within the LTM, each at the $p < 0.001$ level. Children from the West were also the most likely to experience unmet care at a rate of 2.217 ($p < 0.01$) times that of children from the Northeast.

DISCUSSION

This research concludes that health insurance status serves as an important predictor for the degree of children's accessibility, continuity, and comprehensiveness of primary health care in the United States. Private health insurance and public health insurance programs for children, i.e., Medicaid and the State Children's Health Insurance Program (SCHIP), provide better accessibility, continuity, and comprehensiveness of primary care than the care received by uninsured children. However, private health insurance does not always lead to better primary care than that provided by Medicaid and SCHIP (or vice versa). Compared to children with private coverage, uninsured children and Medicaid and SCHIP beneficiaries have a higher prevalence of risk factors that are associated with poor primary care and poor health status.

This study analyzes primary health care for children based on: (1) accessibility, (2) continuity of care, and (3) comprehensiveness of care. This research does not attempt to evaluate the coordination of primary care, a fourth element of quality primary care. Several measures were used to evaluate the accessibility of primary care: a physician visit within the last twelve months (LTM), a usual source of care, site of the usual source of care, unmet care due to cost, and the time since last contact with a health professional. In addition to measuring accessibility of care, a usual source of care and the site of the usual source of care also measured the continuity of primary care. A physical within the LTM measured comprehensiveness of care. Finally, excellent or very good health status served as a measure of the actual goal of primary health care, i.e., healthy children. This research controlled for the possible confounding effects of age, citizenship, mother's education, father's education, health status, poverty status, race, and

region. The study initially controlled for birthplace, gender, family structure, family size, and language spoken at home, but these stratifications were later removed (see Methods).

This research indicates that different forms of health insurance have different effects on primary health care for children. Although uninsured children consistently have the worst primary care ($p < 0.001$), this research cannot conclude that private health insurance is associated with better primary care primary care received by Medicaid or SCHIP beneficiaries, with or without controlling for confounding. Thus, the relationship between insurance status and primary care cannot conclusively be determined.

In addition to health insurance status, multiple factors serve as a determinant of the accessibility, continuity, and comprehensiveness of primary care. Important risk factors include age, citizenship, mother's education, poverty status, and region. Specifically, adolescents 12 to 17 tend to have worse primary care than children 0 to 11. American citizenship is associated with better primary care than the care received by non-United States citizens. Higher levels of educational attainment for mothers are associated with increasingly better primary care for their children. Although this relationship appears to hold in some respects for the education of fathers, higher levels of mother's education are associated with better primary care than corresponding levels of father's education. Poverty is another risk factor, but the effect of familial income below 200% of the federal poverty line is not consistent across the dependent variables of this study. Children's residence in the West and South regions are other important risk factors.

Past studies by Newacheck et al. (1998) and Stevens et al. (2006) have found consistent and significant results that health insurance provides better access to and use of care. Newacheck et al. (1998) classify children as uninsured or insured, ignoring the differences among health

insurance providers. Stevens et al. (2006) examines California and concludes that after controlling for certain factors, at-risk children have poorer primary care access, but greater comprehensiveness of care. This research questions the conclusions reached by Stevens et al. (2006) when viewed at the national level. The inconsistent results with and without controls suggest that quality primary care depends on much more than health insurance.

This research has several limitations. First, the National Health Interview Survey (NHIS) data is cross-sectional and does not indicate causality. Second, the risk factors included do not constitute an exhaustive list. Third, the effect of multiple risk factors on the accessibility, continuity, and comprehensiveness of children's primary health care was not examined. Fourth, the primary care measures in the NHIS are limited, but these traditional measures were selected to facilitate comparability of data. Fifth, most of this research focuses on the effect of health insurance on access to care—one of the four features of primary care—with comparatively little analysis dedicated to the other features of primary care.

Overall, this study concludes that health insurance coverage status is an important determinant of the accessibility, continuity, and comprehensiveness of primary health care in the United States. However, clear relationships cannot be established to conclude how government health insurance performs relative to private insurance. Government health insurance programs ostensibly aim to provide health insurance (and health care) to children without crowding out private health insurance. Because research suggests that crowd out rates may be as high as 60%, Medicaid and SCHIP can, at best, be judged as partially successful programs (Jonathan Gruber and Kosali Simon 2008). Although causality cannot be demonstrated, children with Medicaid and SCHIP tend to have greater accessibility, continuity, and comprehensiveness of primary care

than uninsured children, and similar—if not, better—primary care than children with private insurance, especially when controlling for other risk factors such as age, citizenship, mother’s education, poverty status, and region.

FUTURE RESEARCH

This research builds upon past research by examining the effect the type of health insurance has on the accessibility, continuity, and comprehensiveness of primary health care for children. Important differences were identified between the children covered by private insurance, Medicaid, and the State Children’s Health Insurance Program (SCHIP). Future research should continue to view health insurance by the type of provider: private, public, or other. Greater understanding of the “other” category of health insurance is needed. This research did not examine the quality of care provided, so future research could examine these differences. Furthermore, this research ignores the fourth feature of primary care, i.e., coordination of care, due to the lack of an appropriate indicator. Identification and analysis of coordination of care is needed.

This research also ignores the effects of discontinuous health insurance coverage on primary care. Examining NHIS data from 2000 to 2001, Olson, Suk-fond, and Newacheck (2005) found that 6.6% of children were uninsured and an additional 7.7% had gaps in insurance during the year. Future research should examine the effects of discontinuous health insurance by type of provider on primary health care for children. Specifically, examination of full-year private insurance, full-year public coverage, full-year uninsured status, and discontinuous coverage might help to establish clearer relationships between the dependent variables analyzed by this study.

This research identified many risk factors for poor primary care among children—age, citizenship, mother’s education, poverty status, and region. Many of these risk factors are statistically significant across three of the four dependent variables used in this study—physician

visits within the past year, a usual source of care, and a physical within the last twelve months (Table 6). However, many of these same relationships do not hold for unmet care due to cost, a measure of access to primary care. Understanding this difference could shed light on improving the accessibility of primary care. Moreover, the importance of the region control variable should also be explored further by looking also at population density, e.g., stratifying the sample into urban, suburban, and rural areas. However, limitations of the NHIS dataset prevented this analysis. Finally, examining the effect of multiple risk factors would enhance understanding of the key barriers to primary health care for children.

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APPENDIX

NHIS 2006-2009 Variable Codes

Variable	NHIS 2006-2009 FinalDocName Codes
<i>File Identification</i>	
Household Identifier	hhx
Family Serial Number	fmx
Person Number (within Family)	fpx
<i>Insurance Status</i>	
Uninsured	notcov
Medicaid	medicaid
SCHIP	schip
Private	private*
Other	(remainder)
<i>Dependent Variables</i>	
Physician Visit within LTM	chcsyr82
Usual Source of Care	cusualpl
Physical within LTM	chpxyr_c
Unmet Care within LTM (Cost)	pnmed12m
Time Since Seen Last Health Professional	cmdlongr
Usual Site of Care	cplkind
<i>Confounding Factors</i>	
Age	age_p
Citizenship	citizenp
Mother's Education	mom_ed
Father's Education	dad_ed
Health Status	phstat
Poverty status	rat_cat (2006), rat_cat2 (2007-2009)
Race/ethnicity	hiscodi3
Region	region

Note: *Overlaps with medicaid and schip were classified as Medicaid/SCHIP. See Methods for explanation.