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The Impact of the State Children's Health Insurance Program on Children's Access  
to Care and Use of Health Care Services

by

Karen G. Duderstadt PhD-C, RN, CPNP

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Nursing & Health Policy

in the

GRADUATE DIVISION

of the

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

Date

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## Acknowledgment

The topic of public health insurance and its impact on the health and well being of children has been a focus of mine for many years. As a pediatric health care provider in the community, I experienced first hand the difference a strong public health insurance program can make in the lives of children living in low-income families. As Director of Clinical Services at Valencia Pediatrics in the 1990s, I witnessed the growing numbers of uninsured children who were unable to obtain needed health care services. As this crisis unfolded nationally, I followed the development of Clinton's child health insurance plan and the enactment of *The Balanced Budget Act of 1997*, which created the State Children's Health Insurance Program (SCHIP) providing publicly funded health insurance for children living in low-income families. I witnessed the creation and implementation of California's SCHIP, *Healthy Families*, and the response to the program by community agencies, health care providers, and families. Therefore, my focus during doctoral program on studying the health outcomes of children enrolled in publicly funded health insurance programs was a logical yet passionate next step in advocating for improved funding for children's health care.

This dissertation reflects the mentoring and guidance of my faculty colleagues. I am indebted to my dissertation committee-Drs. Robert Newcomer, Charlene Harrington, Paul Newacheck, and Dana Hughes. Dr. Charlene Harrington was instrumental in creating the Nursing & Health Policy specialty at UCSF School of Nursing, which allowed me to pursue my interest in health policy within the context of the field of nursing. Her leadership for nurses in the area of health policy has been unrivaled, and she pushed me to achieve throughout my studies. Dr. Robert Newcomer, my Dissertation



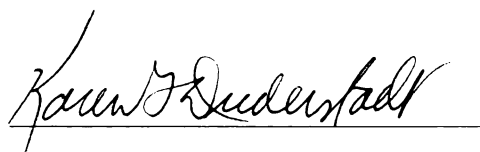
Chair, provided critical editing, constructive criticism, and constant support for which I am deeply grateful. Dr. Paul Newacheck, at the Institute of Health Policy Studies, graciously allowed me to become part of his research team and to learn methods of health services research. His expertise in the field of health services research and the study of publicly funded health insurance programs for children and adolescents guided and inspired my dissertation work. He became a trusted colleague during my doctoral studies. Dr. Dana Hughes was a valued member of the research team. She was an early supporter of my affiliation with the Institute of Health Policy Studies and encouraged me throughout my doctoral studies. This dissertation would not have come to completion without the support and mentoring of these faculty colleagues. My thanks to all of them.

Data presented in this dissertation were from the National Center for Health Statistics. The data analyses and interpretations reflect the work of the research team and may not reflect the views of the National Center for Health Statistics. This study was supported by funding from the Centers for Disease Control and Prevention, the National Institute for Dental and Craniofacial Research, and the National Center on Minority Health Disparities at the National Institutes of Health.

In part, the text of this dissertation is a reprint of the material as it appears in *Pediatrics* and *Public Health Reports*. The co-authors listed in the publications directed and supervised the research that forms the basis for the dissertation. In addition to my dissertation committee, Dr. Mah-Jabeen Soobader was the data analyst on the study and co-author on the publications.

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Finally, I am indebted to my husband, Christopher, who encouraged me to pursue my goal of doctoral study and provided the daily support for me to be successful in completing my dissertation.

A handwritten signature in cursive script, reading "Karen G. Duderstadt", written over a horizontal line.

Karen G. Duderstadt PhD, RN, CPNP

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**THE IMPACT OF THE STATE CHILDREN'S HEALTH INSURANCE  
PROGRAM ON CHILDREN'S ACCESS TO CARE AND USE OF HEALTH  
CARE SERVICES**

**By**

**Karen G. Duderstadt PhD, RN, CPNP  
University of California, San Francisco  
2006**

**Abstract**

This study examines the role of recent public health insurance expansions, particularly the State Children's Health Insurance Program (SCHIP), in improving access to health care and use of health care services for children living in low-income families using the National Health Interview Survey (NHIS). The first study examines the impact of SCHIP on access and use in a before and after analysis using 1997 as a baseline and 2003 as the endpoint. The results indicate that SCHIP has lead to substantial gains in insurance coverage for children living in families with incomes between 100% and 199% of the FPL-- the target income group for SCHIP. Although some of the gains in public coverage were offset by losses in private coverage, the proportion of children in the target income group who were uninsured for the full year declined by nearly half between 1997 and 2003. There was also a significant reduction in the proportion of children without a provider visit in the past year. Other measures included in the study such as receipt of preventive well child visits showed no significant changes over the study period.

The second study focuses on oral health in children and examines the impact of recent public insurance expansions on the use of dental care in children from 2 to 17 years of age. A trend analysis was conducted using seven years of data from the NHIS-

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1983 as the baseline and 2001-02 as the endpoint-with two intermediate data points 1988-89 and 1997-98. The results indicate that use of ambulatory dental care has increased dramatically for children. In 1983, 38.5% of children had no dental care within the previous 12 months; and by 2001-02, 26.3% of children reported no dental care in the previous 12 months, a 12 % reduction during the study period. Frequency of unmet dental care remained unchanged between the 1997-98 and 2001-02 point.

These study results provide further evidence that expansions of public health insurance have improved the health and health outcomes of America's children, and that the expansions represent an important public health accomplishment for children living in low-income families.

A handwritten signature in dark ink, appearing to read "Robert Newcomer", written over a horizontal line.

Robert Newcomer, PhD  
Dissertation Committee Chair

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*Introduction:*

*Access to Care & Children's Health*

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Access to health care for children living in low-income families in the United States continues to be a challenge. Poor and near poor children are more likely to be uninsured or underinsured.<sup>1</sup> Uninsured children have decreased access to health care services and often have more serious health problems than children in privately or publicly insured programs. Uninsured children are more likely to have unmet health needs and to delay seeking health care, particularly oral health care. Oral health care ranks as the greatest unmet children's health need in the U. S., and access to dental care is particularly problematic for poor and near poor children (Lewis, Grossman, Domoto, & Deyo, 2000; Newacheck, Hughes, Hung, Wong, & Stoddard, 2000).

Federal and state programs have significantly expanded in the past 20 years to provide health insurance for poor and near poor children. Medicaid eligibility expansions in the early 1990s provided improved access to care for children less than 5 years of age and extended care for children up to 19 years of age. Despite these expansions, many children remained uninsured. The implementation of the State Children's Health Insurance Program (SCHIP) in 1997 marked the largest single expansion of publicly funded health insurance in the last 30 years targeting uninsured children living in low-income families who were ineligible for Medicaid. The SCHIP legislation was motivated by the belief that expanding health insurance coverage would increase access to health care services and improve the overall health of children.

Studying the impact of health insurance on children's health continues to be an important endeavor in order to inform federal and state policy. SCHIP offers researchers

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<sup>1</sup> 'Poor' children are those children living in families with incomes <100% of the Federal Poverty Level (FPL). The FPL when SCHIP was established was a yearly income of \$14,995 for a family of four. Poverty level in 2005 is expressed as a yearly income of \$19,350 for a family of four (DHHS, 2005). 'Near poor' children are those children living in families with incomes between 100% and 199% of the FPL.

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an opportunity to examine the impact of publicly funded health insurance on populations of children who were previously uninsured or underinsured. SCHIP allows researchers to study patterns of use of health care services in children and adolescents who previously had limited access to well child care services and often had no access to continuity of care for sick care. Studying the health outcomes of this population could provide evidence of the value of eligibility expansions in underserved populations.

This dissertation examines the role of public insurance expansions in improving access to health care for poor and near poor children and the use of health care services in previously uninsured or underinsured populations of children and adolescents.

### **Methodological Approach**

The National Health Interview Survey (NHIS) sponsored by the National Center for Health Statistics (NCHS) is the data source for the study of the impact of public insurance expansions on the health of children and adolescents living in low-income families. The NHIS is a continuing nationally representative household survey with an annual sample of approximately 40,000 households which includes data on approximately 30,000 children under 18 years of age (NCHS, 2003; Schoenborn, Adams, & Schiller, 2003). Trained personnel from the US Bureau of the Census conduct face-to-face interviews with an adult caretaker, usually the mother, who provides proxy responses for children less than 17 years of age in the survey. Seventeen year olds are permitted to respond for themselves.

This dissertation used NHIS data from a wide range of years to examine the impact of public insurance expansions on access to health care for children. For the study on the impact of public insurance expansions on children's access to oral health care, the 1983

NHIS data were used as the baseline for the trend analysis and 2001-02 as the endpoint. This trend analysis included two intermediate time points-1988-89 and 1997-98. The NHIS was redesigned in 1997 and made data retrieval and analysis for this study challenging due to substantial changes in core files and questionnaire redesign.

The redesigned NHIS consists of core questionnaires for household, family, person and child (NCHS, 2000). Data from the 1997 and 2003 NHIS family core files and sample child files for children under 18 years of age were used in a before and after analysis of the impact of public insurance expansions, particularly SCHIP, on children's access and use of health care services.

Missing income data is problematic in all household surveys. To address this issue, the research team used a set of data files NCHS has developed with imputed values for cases with missing income data. In most years, the overall response rate for the NHIS has exceeded 90% (Dey, Schiller, & Tai, 2004). The response rates for the 1997 sample child and family surveys were 84.1% and 90.3% respectively; the respective response rates for 2003 were 81.1% and 87.9%. Sample sizes and weighted national population estimates are presented in the methodology section in the studies and accompanying tables.

The statistical analyses were conducted using the SUDAAN statistical software. This statistical software program adjusts for the complex sample design of the NHIS in computing standard errors (Research Triangle Institute, 2001). Funding for the statistical analyst was provided in part by a grant from by a cooperative agreement from CAN-DO: Center to Address Disparities in Children's Oral Health, sponsored by the National Institute for Dental and Craniofacial Research and the National Center on Minority Health Disparities at the National Institutes of Health. Additional funding for the trend analysis on

access to oral health care was provided by a cooperative agreement from the Centers for Disease Control and Prevention.

### **Organization of the Dissertation**

This dissertation is presented in two parts. Part I of the dissertation provides and overview of the State Children's Health Insurance Program (SCHIP). Chapter 1 presents a brief history of the establishment of SCHIP beginning with the enactment of the *Balanced Budget Act of 1997* and follows the development, implementation and growth of SCHIP over the past eight years. It presents a profile of the demographics of SCHIP enrollees including the prevalence of children with special health care needs (CSHCN) found to be as high or higher than in the general pediatric population (Szilagyi et al., 2003).

Chapter 2 presents a literature review of the available research on health outcomes of children and adolescents enrolled in publicly funded health insurance programs, particularly SCHIP. State and national studies are included in the review. The state level studies examine the health outcomes of children who were enrolled in pre-SCHIP programs established as demonstration programs prior to the implementation of SCHIP, particularly New York State's Child Health Plus program, and other state studies including findings from the Children's Health Insurance Research Initiative which examined the impact of SCHIP in five states (Kansas, Florida, New York, Alabama, Indiana) (Brach et al., 2003). The national studies examine the patterns of access to care and use of health care services of all children living in low-income families who are eligible for publicly funded health insurance programs. Chapter 2 discusses gaps in the current literature, particularly in national studies, and the need for further study of access

and utilization patterns of SCHIP enrollees to inform program design and federal policy makers.

Chapter 3 presents an historical overview of Andersen's Behavioral Model of Health Services Use. Andersen (1968) conceptualized *need* as a primary predictor of use of health care services and *perceived need* as a predictor of care-seeking behaviors and adherence to medical regimens in adults. The original model did not focus on health outcomes, but use of health care services measured by select variables chosen to explain use and influenced by *predisposing* and *enabling factors* or characteristics of the individual seeking care (Andersen, 1968; Andersen, Kravitis, & Anderson, 1975). Health outcomes were introduced into the Andersen model in later adaptations expanding the model beyond predicting use to examining the outcome of use. Health status was introduced as an initial measure of health outcomes (Andersen, Davidson, & Ganz, 1994).

Andersen's conceptual framework provides the basis for empirical analysis in the child health policy literature and for evaluating the impact of access to care on children's health (Cohen & Bloom, 2005; Cunningham, Hadley, & Reschovsky, 2002a, 2002b; Lave et al., 1998; Newacheck, Park, Brindis, Biehl, & Irwin, 2004; Newacheck, Stoddard, Hughes, & Pearl, 1998; Szilagyi, Holl et al., 2000; Szilagyi, Zwanziger et al., 2000). Andersen's model provides the theoretical underpinning for this dissertation and guides the research process.

Chapter 3 examines an adaptation of Andersen et al. (2002) theoretical model of *Individual & Community Predictors of Access to Medical Care for Low-Income Populations*. In this adaptation, Andersen and colleagues present a theoretical approach

to understanding the impact of community-level variables on access to care for vulnerable populations including children (Andersen et al., 2002). An application of Andersen's model to health services research in children is discussed, and an adaptation of the model is presented which expands the model to include measures of access to care and use of health care services used in the SCHIP study. This manuscript is ready for submission and is suitable for publication in peer reviewed medical or health policy journals.

Part II of the dissertation presents two data based manuscripts. The first manuscript, Chapter 4 "The Impact of Public Insurance Expansions on Children's Access and Use of Care", presents the results of a before after analysis of the impact of public insurance programs on the patterns of access to care and use of health care services for children living in families with incomes between 100% and 200% of the Federal Poverty Level. The study examines selected measures of access and use from the 1997 NHIS data before the implementation of SCHIP and the 2003 data at the six-year point after implementation. At the time of this writing, this chapter has been accepted for publication by *Pediatrics*, and is reprinted here with permission of the American Academy of Pediatrics.

The second manuscript, Chapter 5 "Children's Health Needs and Oral Health Care", focuses specifically on select measures of access to oral health care from the NHIS and presents a trend analysis using seven years of data-1983 as a baseline and 2002 as the endpoint. Two intermediate time points were examined to establish the trend line-1988-89 and 1997-98. The study examines the impact of public insurance expansions on access to oral health care and addresses the question, "Have expansions in Medicaid

and SCHIP resulted in a narrowing of income disparities in use of dental care for children?" This manuscript was accepted for publication by *Public Health Reports*, and is reprinted here with permission of the Association of Schools of Public Health.

The final chapter, Chapter 6, reviews findings from the research presented in this dissertation, and discusses the contribution the studies make to the body of knowledge on the impact of publicly funded health insurance on the health and health outcomes of children who were previously uninsured or underinsured and living in low-income families. This dissertation is completed at a time of major consideration of the role of the public in assuming responsibility for the provision of health care services for children and adolescents. Publicly funded health insurance programs currently undergoing major transitions will predict future access to care or inhibit access to use of health care services for children living in low-income families. Chapter 6 presents a case for the importance of the reauthorization of SCHIP, and views SCHIP reauthorization as a predictor for the public's commitment to the future health of all children.

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## Part I

### An Overview of The State Children's Health Insurance Program

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*Chapter 1*

*The State Children's Health Insurance Program: Then and Now*

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The number of children who lack health insurance in the United States has changed dramatically over the past two decades. Almost 80% of children were covered by private health insurance in the late 1970's (Cunningham & Kirby, 2004). Since then there has been a decline in private coverage-21% over the past twenty years-and an increase in uninsurance rates particularly in children living in low-income families (Cunningham & Kirby, 2004). Rising rates of uninsurance in the 1990s prompted Congress to enact expansion of Medicaid eligibility for poor and near poor children living in low-income families. Although this improved access to health care for poor children, many near poor children remained uninsured.<sup>1</sup> In 1997, Congress enacted the State Children's Health Insurance Program (SCHIP) as Title XXI of the Social Security Act providing an opportunity to extend health insurance to a population of children that had not been well covered through Medicaid or through private, employer-based insurance (Rosenbaum, Johnson, Sonosky, Markus, & DeGraw, 1998). SCHIP provides an opportunity to examine the impact of health insurance and access to care on populations previously uninsured and to clarify the value of eligibility expansions in underserved populations (Andrulis, 1998).

This chapter will focus on the trends in uninsurance rates in children which led to the establishment of the State Children's Health Insurance Program (SCHIP), review the structure of SCHIP and the variation in the program among states, the demographics of some SCHIP enrollees, SCHIP successes, and the current challenges confronting the program.

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<sup>1</sup> 'Poor' children are those children living in families with incomes <100% of the Federal Poverty Level (FPL). The FPL when SCHIP was established was a yearly income of \$14,995 for a family of four. Poverty level in 2005 is expressed as a yearly income of \$19,350 for a family of four (DHHS, 2005). 'Near poor' children are those children living in families with incomes between 100% and 199% of the FPL.

## Background

The decline in private health insurance coverage beginning in the 1980s and the trend in uninsurance rates among children living in low-income families in the 1990s have been attributed to a number of factors. The high annual increases in private health insurance premiums from the 1980s to the mid-1990s contributed to a low take-up rate of employer-sponsored health insurance.<sup>2</sup> The outsourcing of jobs and redefining workers as contractors rather than employees making them ineligible for employer covered benefits affected the stability of low-income families. Incomes of families stagnated in the 1980s and led to an increase in child poverty, and to an increase in single-parent families. While the rate of poverty in children declined from 20.4% in 1987 to 16.3% in 2001, the rate of private insurance coverage did not change significantly (Cunningham & Kirby, 2004). This trend away from employer-sponsored health insurance created a structural change in children's health insurance. An additional factor which impacted the rate of children's health insurance coverage was the increase in immigrant population in the U. S. particularly from Latin America (Guendelman & Pearl, 2001; Holahan, Dubler, & Kenney, 2003).

The trend in uninsurance disproportionately affected poor and near poor children, in particular Hispanics, adolescents, and children of immigrant families (Holahan, Dubler, & Kenney, 2003). The uninsurance rate among poor children living in families below 100% of the Federal Poverty Level (FPL) was 24.1% in 1987 (Cunningham & Kirby, 2004). Changes in Medicaid in the early 1990s began to reduce this trend. However, a change in eligibility regulations in the mid 1990s limiting allowable earned income in

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<sup>2</sup> Take-up is defined as an employee who increased their out-of-pocket costs in order to continue employer-sponsored health insurance benefits.

families below 200% of the FPL contributed to further declines in public coverage. By 1997, the rate of uninsurance was 19.5% in near poor children living in families with incomes between 100% and 200% of the FPL, higher than estimates for poor children (Holahan, Dubay, & Kenney, 2003).

The lack of health insurance places the health of poor and near poor children at risk. Newacheck et al. (1998) and others looking at the consequences of uninsurance for poor and near poor children found that uninsured children were more than twice as likely as insured children to lack an identified health care provider, and 1.7 times more likely to lack access to after hours care. Families of uninsured children were 40% more likely than insured families to report dissatisfaction with the health care services received. Uninsured children were more than three times as likely to report missed or delayed health care than insured children. Insured children had approximately three times the number of health care contacts with health care providers as uninsured children with special health care needs (Guendelman & Pearl, 2001; Newacheck, Strickland, & Shonkoff, 1998). Uninsurance increases parental anxiety due to a lack of confidence they will be able to obtain needed health care for their children. Research has demonstrated that insuring children can reduce financial stress on families (Dubay & Kenney, 2001; Hughes & Ng, 2003; Lave et al., 1998). Further, evidence suggests that insured parents may be more effective than uninsured parents at managing the health care needs of their children. Low-income insured children with an uninsured parent are about four percentage points less likely to have received recommended well-child care compared to low-income insured children with insured parents (Kleinman, 2002).

## Medicaid Expansions

The expansions of Medicaid eligibility enacted by Congress since 1988 have dramatically increased the number of low-income children and families eligible for public health insurance. In 1989, coverage of children < 6 years of age was mandated for families below 133% of the FPL; and in 1990, coverage was mandated for children and adolescents up to 19 years living in families with incomes below 100% of Federal poverty level (HCFA, 1999b). The Medicaid expansions improved access to care and for poor and some near poor children living in low-income families. Between 1985 and 1998, enrollment of low-income families in Medicaid due to expanded eligibility increased 75% and spending for Medicaid increased by 100% during the same period (HCFA, 1999a). This increase in Medicaid expenditures for children represented a significant increase in the percentage of state expenditures on health.

In 1996, Congress passed a second initiative impacting poor and near poor children. The Personal Responsibility and Work Opportunity Act of 1996<sup>3</sup> (The ‘Welfare to Work’ program) transitioned families and single parents off welfare rolls to low wage jobs, and abolished low-income benefits for illegal immigrants. This program was designed to reduce the number of persons on welfare and, therefore, decrease some of the federal and state burden in entitlement programs. However, the program had adverse consequences on health insurance for children. Welfare-to-work policies increased work incentives for poor parents and reduced the likelihood of eligibility for Medicaid. Yet full-time-year-round parental work did not improve employer-sponsored insurance coverage or use of health care services for children (Guendelman & Pearl, 2001).

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<sup>3</sup> H. R. 3743

“Welfare to Work’ families found it increasingly difficult to interpret and navigate the welfare reform laws, and the new rules made it difficult for working parents to comply with the redesigned Medicaid program application and requirements (Pappas, 1998). In 1997, one year after leaving welfare, 49% of women and between 24% and 30% of children in near-poor families were uninsured compared to 9% in poor families (Feder, Uccello, & O'Brien, 1999; Garrett & Holahan, 2000). This shift in public insurance coverage contributed to the growing numbers of near poor families that were worse off than poor families. Medicaid eligibility expansions did not cover many near poor children living in families earning incomes between 100-200% FPL. A third initiative was implemented to address this ‘gap’ in public insurance coverage for near poor children, the State Children’s Health Insurance Program.

## **SCHIP**

Congress passed *The Balanced Budget Act of 1997* which created the State Children’s Health Insurance Program (SCHIP) within the context of Title XXI of the Social Security Act. *The Balanced Budget Act* allocated \$40 billion over ten years from 1997 to 2007 to extend coverage to children not already covered by Medicaid or private insurance (Shi, Oliver, & Huang, 2000). The primary purpose of SCHIP was to reduce the number of uninsured children and create a safety net for children living at or below 200% of the FPL (FPL). The SCHIP legislation was motivated by the belief that expanding health insurance coverage increases utilization of preventive health care services and improves the health of low-income children and families (Kaestner, Joyce, & Racine, 2001).



The secondary purpose of SCHIP was to improve the quality of health care for the large numbers of uninsured children (Shi, Oliver, & Huang, 2000). The SCHIP legislation requires states to report on efforts to improve the quality of their health coverage but does not suggest any target quality guidelines (Starfield, 2000). States are left to establish SCHIP quality measures as part of the program design.

### **Three program options to states**

The SCHIP legislation provided three options for states to implement a block grant program for low-income, uninsured children. States could provide this coverage by expanding their existing Medicaid program, creating a free-standing separate insurance program more like employer-sponsored private insurance, or combining the two options. States that chose to expand their Medicaid programs were required to adhere to existing eligibility and benefit provisions under the federal Medicaid regulations. States that created separate programs were allowed greater flexibility in setting program eligibility, benefits, and cost-sharing, and could design benefit packages less generous than required under Medicaid, however, they were not permitted to use federal funds to assist children who are non-citizens. States could act as insurers or contract with managed care organizations or community-based health systems to provide coverage. Public involvement in program design and implementation was required (Shi, Oliver, & Huang, 2000).

### **Administration and financing**

The partnership between the federal government and the states created under the *Balanced Budget Act* obligated the federal government to pay 65% or more of the cost of

implementing SCHIP in each state. States must contribute funds to participate in the program. SCHIP is considered a means-tested federal benefit (Shi, Oliver, & Huang, 2000), and federal funds are allocated to states based on the numbers of uninsured children with family incomes below 200% of the FPL, or 150% of the state's Medicaid eligibility requirements. Adjustments for differences in health care costs were made across states (Buren & Ullman, 1999). As of September 1999, all states, territories, and the District of Colombia had approved SCHIP plans in place (CMS, 2002). 35 states are currently operating either separate SCHIP programs or a combination of SCHIP and Medicaid expansion programs. The proportion of children in SCHIP who were enrolled in separate programs rose from 65% in fiscal year (FY) 1999 to 74% in FY 2001 (CMS, 2003a).

State programs reflect different income eligibility requirements, premiums and health benefits (CMS, 2004). SCHIP eligibility ceilings vary widely due to the existing Medicaid eligibility threshold in each state. Medicaid eligibility requirements range from a minimum of 133% of the FPL in some states to the maximum allowable Medicaid expansion eligibility of 185% of the FPL in New York State (Brach et al., 2003). SCHIP eligibility ranges from 133% to 200% of the FPL in Alabama to 185% to 250% of the FPL in New York in children birth to 6 years of age. By October 2001, 38 states and the District of Colombia had established SCHIP eligibility ceilings at 200% or above the FPL (CMS, 2002).

States with separate SCHIP programs were allowed to establish insurance premiums for enrollees living in families with incomes above 150% of FPL. Families earning incomes 150% to 250% of FPL have a wide range of premiums. Families

typically have \$25 to \$50 per child annual enrollment fee and monthly premiums in the range of \$9 to \$15 per child per month with maximums from \$15 to \$45 per family per month depending on family size (CMS, 2004). Some states viewed uninsurance as a family issue and began enrolling parents of uninsured children to increase rates of participation in SCHIP programs. In 2003, five states covered uninsured parents; Arizona, Minnesota, New Jersey, Rhode Island, Wisconsin (CMS, 2003).

### **Demographics of SCHIP enrollees**

A number of studies have presented an important profile of the children enrolled in state-based pre-SCHIP<sup>4</sup> programs and SCHIP (Brach et al., 2003; Dick et al., 2003; Holl et al., 2000). Brach et al., (2003) presented a baseline portrait of children enrolled in SCHIP in Alabama, Florida, Kansas, Indiana, and New York accounting for almost 30% of total SCHIP enrollment in 2001. Most of the children enrolled in SCHIP in these states were from families with incomes <150% of FPL. Seventy-nine percent of the families in New York State were living with incomes below 150% of FPL. Half of the families surveyed in the five states were from single-parent households. About 25% of the parents of SCHIP children had not completed high school, and half did not have education beyond high school. The majority of children had a working parent in the home (80% in Florida and New York, 87% in Kansas). Black non-Hispanic and Hispanic make up 45% of SCHIP enrollees in New York; 26% in Florida are Hispanic children (Brach et al., 2003). A large portion of the children reported using health care services the year prior to enrollment in SCHIP, and the majority of SCHIP enrollees (75% to >90%)

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<sup>4</sup> pre-SCHIP programs began in 1991 in five states and were authorized by the federal government to enroll children living in families with incomes between 100% and 199% of the FPL who lacked health insurance coverage and were ineligible for Medicaid. The programs transitioned to SCHIP in 1998.

had a usual source of care (USC), although up to 41% changed their usual source of care following enrollment. 32% to nearly 50% of the children enrolled in SCHIP in the 5 States reported unmet health needs despite the receipt of health care services prior to SCHIP enrollment (Brach et al., 2003).

SCHIP has enrolled many Children with Special Health Care Needs (CSHCN) despite the expectation that the enrollment numbers of this population would be lower due to enrollment in Medicaid or other carve out programs. CSHCN are those children who have or are at increased risk of a chronic physical, developmental, behavioral, or emotional condition and who require health related services (McPherson, Arango, & Fox, 1998); they are estimated to be approximately 18.2% of the general population of children from birth to 18 years of age in the U. S. (Newacheck, Strickland, & Shonkoff, 1998). CSHCN are generally eligible for Medicaid and other state services if their condition causes significant disability. Szilagyi et al. (2003) presented a survey of parents of SCHIP enrollees in 4 states, and found the prevalence of CSHCN in SCHIP to be as high or higher than the general population-17% in New York, 18% in Florida and 25% in Kansas. CSHCN enrolled in SCHIP represented children with a wide range of health care needs who live in families that experience disruptions in insurance (Szilagyi et al., 2003). Most CSHCN enrolled in SCHIP were connected to the health care system prior to enrollment, including having a usual source of care (USC) and a higher probability of having a preventive care visit (>65%), though between 30 to 40% reported unmet health care needs before enrollment in SCHIP (Szilagyi et al., 2003).

## **SCHIP now**

The State Children's Health Insurance Program (SCHIP) has made progress in reducing the number of low income, uninsured children in the U. S. The percentage of children living in families with incomes <100% of the FPL who were uninsured in 1998 declined from 22.7% to 16.1% in 2003 (Cohen & Bloom, 2005). Among the target population of 100% to 200% of FPL, uninsurance rates have fallen from 23.4% in 1998 to 16.3% in 2003. This represents a decline of more than one-third of the target population (Cohen & Bloom, 2005).

It was estimated that federal funding combined with state contributions would be sufficient to cover approximately 5.8 million children (Ullman, Gruen, & Holohan, 1998). Enrollment began in January 1998 and increased rapidly. In 2000, the number of children ever enrolled in SCHIP was 3.3 million and increased to 4.6 million in fiscal year FY 2001 (CMS, 2002). In FY 2002, 5.3 million children were enrolled in SCHIP for at least part of the year (CMS, 2003). By the completion of FY 2004, the number of children ever enrolled in SCHIP rose to 6.1 million (CMS, 2004). The number of children reflected in monthly SCHIP enrollment counts is, of course, lower than the overall numbers of children ever enrolled. In December 2001, the number of children with SCHIP coverage reached 3.4 million; and by December 2004, 4.4 million children had SCHIP coverage (CMS, 2005; Smith, Rousseau, & O'Malley, 2004). Enrollment for uninsured parents has opened in four additional states over the past two years including Colorado, Illinois, Michigan, and Oregon (CMS, 2005).

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## Programmatic Challenges

SCHIP's apparent success in enrolling low-income children was achieved amid administrative challenges and fiscal difficulties. SCHIP faces a number of programmatic challenges. Parents are confused about eligibility between SCHIP and Medicaid and submit incomplete applications. Rates of incomplete applications have varied from 35 % in Texas to 70 % in California, even among parents who received application assistance (CMS, 2003a; L. C. Dubay, I. Hill, & G. M. Kenney, 2002). This is evidence that SCHIP and Medicaid application procedures are still too complex for some families and continue to be a barrier for enrolling uninsured children (L. Dubay, I. Hill, & G. M. Kenney, 2002).

Enrolling teens in SCHIP has been particularly challenging for states. Parents are often less likely to seek insurance for healthy teens and some states already provide access to sensitive services for sexually active teens. However, priorities for teen health indicators include improved immunization rates, teen violence and substance abuse all of which require access to comprehensive adolescent health care (Fox, McManus, & Limb, 2003). SCHIP plays an important role in facilitating access to comprehensive adolescent health care among the target population of teens. Aggressive enrollment and retention are required to reach the potential SCHIP population of adolescents. In 2002, 13.7% of all adolescents in the U. S. were without health insurance (Newacheck, Park, Brindis, Biehl, & Irwin, 2004).

Federal SCHIP appropriations for FYs 2003 and 2004 were considerably lower than the amounts appropriated for the first four years of the program. The 10-year federal funding levels for SCHIP were set in the *Balanced Budget Act of 1997* along with

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reduction goals for the federal budget deficit. This plan included the SCHIP allotments dropping by 26% in 2002 (Mann & Rudowitz, 2005). This decline in federal SCHIP funds occurred at a time of state budget deficits and rising health care costs. Expansions of the eligibility thresholds to increase state enrollment, set in place when more generous levels of federal funds were available, have placed further demands on available state funds. In response to declining federal funds and state fiscal crises, many state have capped SCHIP eligibility levels.

States have begun to experience declines in retention rates of low-income families enrolled in SCHIP. This is thought to be partly the result of the imposition of cost sharing. The financial requirements seem to be too burdensome for some poor and near poor working families, and families may not see the long-term benefits of the program if their child has been healthy. Disenrollment rates of 40% to 50% have occurred in some states as children come up for renewal (CMS, 2003).

Many states imposed waiting periods, lasting 3, 6, or even 12 months, during which a previously insured child had to be *uninsured* before being permitted to enroll in SCHIP. State legislatures adopted these strategies in order to prevent 'crowd out', the substitution of taxpayer funds for coverage already provided through private spending (Kahn & Pollack, 2001). There is evidence to suggest public coverage expansions and SCHIP have resulted in some substitution of public for private coverage. Private insurance coverage among near-poor children declined 7.9% between 1996 and 2002 and may reflect families who dropped private coverage for a lower cost public insurance program (Selden, Hudson, & Banthin, 2004). Brach et al. (2003) reported private insurance was the predominant form of prior insurance in a survey of SCHIP parents in

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five states (Alabama, Florida, Kansas, Indiana, and New York). The major reasons parents reported for loss of prior insurance was change in employment, the high cost of the prior insurance, and the perception that there would be better benefits from SCHIP than their prior insurance. The estimates of children with private insurance coverage who enrolled in low-cost public coverage vary, and evidence of the impact of 'crowd-out' on utilization rates of SCHIP requires further investigation.

Many CSHCN who enrolled in SCHIP had unmet health needs prior to enrollment, and the utilization rates of health care services among CSHCN is known to be higher than the general population of children (Newacheck, Strickland, & Shonkoff, 1998). SCHIP benefit packages were not specifically designed to meet the needs of this population of children which require specialty services, mental health care, developmental and home health services, and often daily prescription medication (Szilagyi et al., 2003). As of 2001, almost all low-income CSHCN were eligible for public insurance and a large portion of them became eligible under SCHIP (Davidoff, Yemane, & Hill, 2004). In a recent survey on health care expenditures for CSHCN reported that CSHCN constituted 15.6% of the population, but accounted for 33.6% of the total health care expenditures (Newacheck & Kim, 2005). SCHIP's financial viability will likely be measured by how effectively they manage this population of special needs children.

### **Annual State Reports**

*The Balanced Budget Act of 1997* requires states to assess and report on their progress in reducing the number of uninsured children below the 200% of the FPL. It also requires the Office of the Inspector General (OIG) to evaluate every 3 years whether

A vertical strip of a book cover, likely from a library or archive. It features a repeating pattern of a square logo with a stylized 'U' inside, followed by the text 'TU Fran BRE' and 'A. UNIVE' in a serif font. The strip is dark and appears to be a close-up of a larger cover design.

states are inappropriately enrolling Medicaid eligible children in SCHIP. States are required to submit an annual report and are encouraged to measure the number or rate of uninsured children at two or more time points during the year. However, much inconsistency remains in state reporting. As of June 2003, 46 states had submitted SCHIP Annual Reports for FY 2002. Only 22 state reports directly addressed the Centers for Medicare & Medicaid Service's (CMS) requirement to report on a change in the number of uninsured in the state (DHHS, 2004). Of the 22 States reporting, 17 reported a reduction in the number of uninsured children in the state, three reported an increase, and two reported no change. 19 other states reported on SCHIP enrollment and did not address the change in the number of uninsured children in the state. The remaining states either did not address the number of uninsured low-income children or report on SCHIP enrollment.

The SCHIP legislation Section 2107 directs states to "describe how performance measures will be assessed through objective, independently verifiable means and compared against performance goals".<sup>5</sup> The absence of defined goals for quality measures of the programs complicates evaluation strategies (Starfield, 2000). The federal government does not require any specific quality guidelines or evaluation standards for reporting health improvement. Researchers studying the program outcomes and evaluating health indicators would benefit from quality standards. SCHIP program design needed to place greater emphasis on the quality of the primary care services delivered in order to advance health outcomes (Shi, Oliver, & Huang, 2000). Measuring quality of health care services remains a challenge in program redesign and

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<sup>5</sup> *The Balanced Budget Act*. Title XXI of the Social Security Act

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implementation, and the success of SCHIP should be measured by its long-term impact on improving the quality of health care services for children and ultimately child health status (Shi, Oliver, & Huang, 2000).

## **Conclusion**

While SCHIP is only a fraction of the size of Medicaid, it has served as a catalyst for **major** reforms in public health insurance programs. The early years of SCHIP implementation witnessed innovations in outreach, enrollment, benefits and access. State Medicaid programs have adopted many of these program innovations. SCHIP gave states great **latitude** in designing programs that appeal to consumers. SCHIP also established the **important** de-linking of health insurance systems from welfare.

Many children in families with incomes below 200% of the FPL remain **uninsured**. In 2002, 2.8 million children age eighteen and under were uninsured but **eligible** for SCHIP (Selden, Hudson, & Banthin, 2004). Simply expanding health **insurance** coverage is not sufficient to ensure children of low-income families have **access** to care that is comprehensive and of high quality (Dubay & Kenney, 2001; Selden, Banthin, & Cohen, 1999). Factors associated with children's access to care and utilization of **health** care services in the target population of families are not yet fully understood. Further research of programs across states is needed to guide SCHIP federal policymakers in optimum program design and evaluation strategies.

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## Chapter 2

## *The State Children's Health Insurance Program: Review of the Literature*

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Since the implementation of the State Children's Health Program (SCHIP) in 1997, much of the focus by policy analysts and researchers has been on SCHIP program design across states, characteristics of SCHIP enrollees, and the impact of SCHIP on reducing the numbers of uninsured children living in low-income families.. Fewer studies have focused on the use of health care services of those children and adolescents enrolled in SCHIP and on the health outcomes of SCHIP enrollees.

This review of literature will focus on the available state and national evaluation studies examining the impact of SCHIP on children's health. The studies are grouped into: pre-SCHIP-related research by state (1998-2002); SCHIP-related research by state including the group of studies from the Children's Health Insurance Research Initiative (2000-2004); and national pre-SCHIP and SCHIP-related research (2000-2005). In depth critiques will be presented of selected studies in each category, a critical analysis of the body of literature, and recommendations for further research.

## **Study Methods**

A query on PubMed using the keywords SCHIP yielded 147 articles, 21 articles in the query focused on outcome measures commonly used to evaluate children's health insurance, specifically measures of access to care and utilization of health care services, and met the criteria for this review of database articles published in peer reviewed journals since 1997, the enactment of SCHIP nationally. Limiting the search to "federal evaluation studies" yielded articles all identified in the general search. Of the federal evaluation studies identified, 7 studies focused on the SCHIP program in New York, 5 of which were based on New York Child Health Plus (CHPlus) data collected prior to 1997. Since the outcomes of the CHPlus program were relevant to the establishment of SCHIP,

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these studies are included in the review. Searches of the literature using related terms also yielded the similar limited number of national studies.

The majority of responses in the query fall into the category of ‘program evaluation’. The program evaluation literature covers a broad range of topics relevant to SCHIP program design and implementation including: outreach and enrollment, federal and state program financing, enrollment of low-income family members, retention of enrollees, and process/program evaluation for Medicaid expansion and separate SCHIP programs. References in this category were utilized in the previous Chapter on the establishment and review of the structure of SCHIP, and in the discussion on the current challenges confronting the program.

I also conducted a search on academic, government and foundation websites relevant to children’s health services research, specifically: The Center for Medicaid and Medicare Services, Urban Institute, Mathematica Policy Research Institute, the UCLA Center for Health Policy, and the Department of Health and Human Services and SCHIP. This search yielded a very limited number of data based articles on outcomes measures, and these are included in the review. As in the PubMed query, the majority of the research briefs on these sites focused on evaluation of the SCHIP program as described above.

### **Conceptual framework**

An adaptation of Andersen’s Behavioral Model of Health Services Use for Vulnerable Populations will be used as the conceptual framework for my review of literature (Andersen, 1995; Andersen et al., 2002; Gelberg, Andersen, & Leake, 2000).

This model presents the use of health care services as being dependent upon

*[Faint handwritten notes and stamps are visible along the right edge of the page.]*

*Predisposing, Enabling, and Need* factors. Individual factors in the model predict health seeking practices and use of health care services. The adaptation adds an *Individual Access* domain to the model which considers the vulnerability of low-income populations including children. This conceptual framework and the application to vulnerable populations of children and adolescents will be presented in a subsequent Chapter.

### **pre-SCHIP-related Research Studies**

Lave et al. (1998) published a pre-SCHIP study on the effect of extending health insurance coverage to children who were uninsured. The authors examined two programs in Western Pennsylvania, the Children's Health Insurance Program of Pennsylvania (BlueCHIP) and the Caring Program administered by Blue Cross/Blue Shield. The programs provided health insurance coverage to children and adolescents living in families with incomes < 235% of the FPL who were previously uninsured, and provided comprehensive benefits including outpatient services, preventive care, vision and dental care, and hospitalizations. The program was no cost to the enrollees with the exception of small co pay for prescription medications.

To evaluate the impact of the BlueCHIP/Caring Program on access to care and utilization of health care services, telephone interviews of parents of enrollees from birth to 18 years of age were conducted within two weeks of enrollment, and at 6 months and 12 months after entering the program. The majority of the interview questions were taken from the National Health Interview Survey (NHIS) and other nationally implemented surveys. The sample was taken from the BlueCHIP/Caring Program enrollment data (See Table 1). Children were aggregated to the family level data and randomly selected to participate in the study. A randomly selected comparison group of aggregate child and

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family data were collected 12 months after the study group. Parents were interviewed with the same telephone survey to observe whether changes were attributable to the insurance programs. This design increases the internal validity of the study over a before-after design and rules out threats to validity from secular trends which may have occurred during the study period. In addition to the demographic data collected in the survey, parents were asked about their experience prior to enrollment and responded to questions measuring access and use of health care services since enrolling in BlueCHIP/Caring Program. Bivariate analysis was performed on all three-time periods, but the results presented focused on the children and adolescents who were continuously enrolled, defined as those enrolled in the program for 12 months.

Study results showed that having health insurance decreased the proportion of children reporting unmet health care needs from 57% to 16%, in the period from 6 months prior to enrollment to 12 months after enrollment in BlueCHIP/Caring Program. Children and adolescents who had a regular source of dental care increased from 60 % to 85% ( $P < .005$ ) at the 12-month interview. Parental report of a usual source of care improved (86.6% to 99.1%,  $P < .005$ ) and Emergency Department (ED) visits decreased (22% to 17%,  $P < .05$ ) during the study period. Parents reported that having health insurance reduced stress and decreased financial difficulties within the family. One of the major findings of the study was providing health insurance coverage did not lead to excess utilization, but more appropriate utilization of available health care services leading the authors to conclude that extending health insurance to children and adolescents represents a responsible expenditure of public funds.



A follow up study by Keane, Lave, Ricci, & LaVallee (1999) using the same BlueCHIP/Caring Program data examined the effect of health insurance by age using measures of access and utilization. The methodology was identical in this study with the exception of the analysis by age group (birth to 5 years, 6 to 10 years, 11 to 14 years, and 15 to 19 years of age). Measures were taken within two weeks of enrollment, and at 6 months and 12 months after enrollment in BlueCHIP/Caring Program. The authors found significant differences in indicators of access and utilization by age in the 6 months prior to enrollment in BlueCHIP/Caring Program, and significant improvement in most indicators for the total sample as well as within each age group after enrollment. Prior to enrollment, younger children (birth to 5 years) were less likely to have been without health insurance than older children (8.6% to ~20% of children 6 to 19 years of age,  $P < .005$ ). Older children 6 to 19 years of age were more likely than younger children to have an unmet need or delayed care (1.9 to 3.2 times), to have no regular provider (2.3 to 2.7 times) and to have limitation of activities attributable to health care. After obtaining health insurance, the age variation in these measures was eliminated. Variation by age of use of health care services remained, but was reduced after the receipt of health insurance. These findings have significant policy implications for SCHIP program design, planning and implementation.

Feinberg, Swartz, Zaslavsky, Gardner, and Walker (2002) contributed to pre-SCHIP research findings in a study of children and adolescents enrolled in the Massachusetts Children's Medical Security Plan (CMSP), a state-sponsored health insurance program for children created in 1994. Children were eligible regardless of income or immigrant status for a limited benefit package that did not include

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Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (a), 10<sup>7</sup> cells/ml (b), 10<sup>8</sup> cells/ml (c), 10<sup>9</sup> cells/ml (d), 10<sup>10</sup> cells/ml (e), and 10<sup>11</sup> cells/ml (f). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (a), 10<sup>7</sup> cells/ml (b), 10<sup>8</sup> cells/ml (c), 10<sup>9</sup> cells/ml (d), 10<sup>10</sup> cells/ml (e), and 10<sup>11</sup> cells/ml (f). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (a), 10<sup>7</sup> cells/ml (b), 10<sup>8</sup> cells/ml (c), 10<sup>9</sup> cells/ml (d), 10<sup>10</sup> cells/ml (e), and 10<sup>11</sup> cells/ml (f).



hospitalizations. Children living in families with incomes < 200% of the FPL received the coverage free of charge and were eligible for hospital coverage through an additional state fund. The authors examined the benefits of providing health coverage to children living in higher income families (>200% of FPL) as compared to those living in middle (>133% to 200% of the FPL) and low-income families (< 133% of the FPL) (Feinberg, Swartz, Zaslavsky, Gardner, & Walker, 2002). The sample included children in all three-income groups who were not previously covered under publicly funded health insurance programs.

This study demonstrated the positive impact of providing health insurance to children regardless of income (Feinberg, Swartz, Zaslavsky, Gardner, & Walker, 2002). Massachusetts CMSP health coverage provided a significant reduction in unmet need among children in all income groups prior to the implementation of SCHIP. SCHIP-eligible children living in families with incomes between 133% and 200% of the FPL were less likely to have an unmet need for services after enrollment, and had less delay in seeking care (5% to 1%,  $P < .01$ ) than in the year prior to enrolling in CMSP. Children across income categories who had an unmet need for vision services and mental health care continued to have difficulty in obtaining services after enrollment (30% to 17%; 33% to 17% after enrollment). Unmet need for dental services, a benefit that was not initially covered, remained high (31% to 27% after enrollment,  $P < .05$ ).

There was a strong association between family income and the reported need for services. Parents with incomes in the middle range (133% to 200% of the FPL), the target SCHIP population, were more than twice as likely to report an unmet health need attributable to lack of health insurance coverage compared with Medicaid-eligible

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children. The authors found lack of a usual source of care was a significant predictor of unmet health care needs (3.4 times more likely before enrollment to 0.88 after enrollment,  $P < .05$ ), which is consistent with previous research on receipt of health insurance in a previously underserved population.

### **pre-SCHIP-related Research Studies in NY State**

#### *CHPlus*

Szilagyi, Zwanziger, Rodewald et al. (2000) published one of the first evaluations of Child Health Plus (CHPlus), a pre-SCHIP-like program established in New York State in 1991. CHPlus is a health insurance plan for children living in families with household income at or below 222% of the Federal Poverty Level<sup>1</sup> who were not eligible for Medicaid. CHPlus covers preventive care and sick care, screening tests, immunizations, referral to specialists and specialty care, Emergency Department (ED) visits, ambulatory surgery and prescription medications. Eligible children were children living in New York State <13 years of age, not enrolled in Medicaid, who lacked health insurance coverage equivalent to that of CHPlus. CHPlus was financed by the Statewide Bad Debt and Charity Pool funds, and administered by fourteen insurance plans operating a variety of models in New York State-indemnity plans, Independent Practice Associations, and managed care plan models of care. Children living in families with incomes > 133% and < 222% of the FPL were eligible for full subsidy CHPlus. Eighty-six percent of families enrolled in the program had incomes below 160% of the FPL and had full premium

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<sup>1</sup> A yearly income of \$13,400 for a family of four was the FPL guideline in 1991 when CHPlus was established (DHHS, 2004).

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subsidy. By 1998, eligibility was increased to include children < 19 years of age and 200,000 eligible families had enrolled their children in CHPlus.

The authors conducted a pre-post study design in 4 regions in New York State including urban and rural counties . The study compared uninsured children before and after they were provided with health insurance in order to determine the association between health insurance and their access to and utilization of health care services and the quality of care received. A random sample of children enrolled in New York State CHPlus stratified by region was selected from 1993 data. Inclusion criteria included children from birth to 12 years of age enrolled in CHPlus, continuous enrollment for 9 months or longer, and complete contact information. Of the 4324 eligible children, parents of 2126 children enrolled in CHPlus participated in the survey. Parent interviews were conducted by telephone to determine demographic characteristics, usual source of health care, child health status, previous health insurance status, and experience with CHPlus. Medical charts were examined to evaluate utilization of preventive care services and quality of care for a subset of children from birth to 3 years of age enrolled in CHPlus.

Enrollment in CHPlus was associated with a significantly lower proportion of children who lacked a usual source of care (1% v. 5% before CHPlus;  $P < .001$ ) with the greatest change in New York City (1% v. 11% before CHPlus), and a >25% increase in total visits to a primary care practitioners, including an additional 2.3 primary care visits and 1.46 additional acute care visits per year. Children were more than twice as likely to have seen a specialist than before enrolling in CHPlus. CHPlus was not associated with an increase in Emergency Department use. Hospitalizations were 36% lower during



CHPlus coverage, although hospitalizations were not a covered benefit. Thirty-three percent of parents reported improved satisfaction with health care services and 2% reported decreased quality of care. The greatest improvement in health status was reported by parents of children who had been previously uninsured for longer than 6 months.

Szilagyi, Shone, Holl, Rodewald et al. (2000) presented a methodological approach to measuring the effects of providing health insurance to a population of previously uninsured or underinsured<sup>2</sup> children. The study design specifically looks at the association between CHPlus and access to care, the utilization and cost of health care services, quality of care received, and health outcomes for children. Study data from CHPlus enrollees in upstate New York between 1991 and 1993 were utilized (Table 1). Inclusion criteria for the sample were similar to the previously presented study except the age of the sample was limited to children birth to 7 years of age. Younger children were the target population in this study as the authors determined this population was more vulnerable to adverse outcomes and more frequent users of preventive care services including immunizations which were key outcome measures in the study. An additional sample of children from 2 to 13 years of age was selected with a diagnosis of asthma to evaluate the impact of health insurance on health outcomes in children with a chronic condition. Study design included a medical chart review at 164 primary care practices, 12 Emergency Departments (EDs), and 6 public health department clinics in the region.

This methodology represents a comprehensive approach to evaluating the association between health insurance and children's health, and provides an important

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<sup>2</sup> Children residing in a household that spends >10% of income on health care.

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contribution to the potential impact of health insurance on children who are uninsured and underinsured. The study findings using this approach are reported in two subsequent publications (Holl, Szilagyi et al., 2000; Szilagyi, Holl, Rodewald, Shone et al., 2000). Holl, Szilagyi et al. (2000) presented the results of a before-and-after study using the CHPlus data comparing health outcomes on 1730 children from birth to 7 years of age (Table 1). CHPlus was associated with a significant improvement in access to care among children 1 to 6 years (preventive care, +1.9% ( $P < .001$ ); sick care +2.7%, ( $P < .001$ )), utilization of health care services among children 1 to 5 years (.23 increase in preventive care visits and .67 increase in sick visits per child per year,  $P < .001$ ), and no significant increase in ED visits, specialty care or hospitalizations. Improved immunization rates (71% vs. 76% after CHPlus), and improved rates of screening for anemia, lead, vision and hearing were verified by medical chart review. 25% of parents reported an improvement in health status for their children. These results are in contrast to the Lave et al. (1998) study in Pennsylvania which showed the demand for need of health care services increased the likelihood of hospitalizations the first 6 months after enrollment.

Health care costs were examined in a follow up study in addition to access to care, utilization of care, and quality of care variables on the same sample population of CHPlus enrollees (Szilagyi, Holl, Rodewald, Shone et al., 2000). Findings for access and utilization measures reported in this study were from the Holl, Szilagyi et al. (2000) reviewed previously. Enrollment data was reported in this study from the CHPlus program between 1991-1993 and showed a relatively low-risk, generally healthy population of children-two-thirds of which resided in two parent families. Lower

*[Faint, illegible markings and bleed-through from the reverse side of the page.]*

enrollment rates among Hispanic and African American children than white children in this early CHPlus data indicated need for more targeted recruitment among eligible families. Health care expenditures for the first two years of the program were associated with modest additional costs -\$71.85 per child per year-for preventive and acute care services in primary care settings.

Other studies have been published examining the characteristics of CHPlus enrollees in New York State (Dick et al., 2003; Holl, Dick et al., 2000; Trafton et al., 2000), including a substudy on the CHPlus data evaluating the association between health insurance, utilization of care, and quality of care among children with asthma (Szilagyi, Holl, Rodewald, Yoos et al., 2000).

Szilagyi, Holl, Rodewald, Yoos et al. (2000) studied 187 children with asthma enrolled in CHPlus who were previously uninsured. 62% of children were reported to have moderate to severe asthma at time of interview. The mean number of primary care visit was significantly higher than before CHPlus (1 to 1.34 visits), follow up visits improved significantly (.86 to 1.32 visits), and there was no significant difference in the mean number of ED visits or hospitalizations before and after CHPlus. 55% of the children with asthma enrolled in CHPlus had a reduced severity of asthma, and 44% reported no change in severity of their asthma. 45% of children reportedly had improved overall health status. CHPlus was associated with overall improvement in parental-reported quality of asthma care. Findings indicate that SCHIP enrollees with chronic conditions such as asthma are experiencing an improved level of service. Further

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research is needed to determine if SCHIP will improve access to care for other children with special health care needs (CSHCN)<sup>3</sup> in New York and across states.

#### *Summary of CHPlus contributions*

CHPlus was associated with improved access, utilization and quality of health care for children living in low-income families, including children with chronic conditions (Holl, Szilagyi et al., 2000; Szilagyi, Holl, Rodewald, Shone et al., 2000; Szilagyi, Holl, Rodewald, Yoos et al., 2000; Szilagyi, Zwanziger et al., 2000). The impact of CHPlus was greatest on the population of children in New York City most impoverished prior to the implementation of the program. The markedly higher use of primary care services was attributable to the increased number of uninsured children in New York City seeking health care services that were previously denied access to care. Since this is the target population of the SCHIP legislation, this finding has important implications for program design and for the recruitment and retention of the children living in families who are uninsured or underinsured.

CHPlus enrolled about 50% of the eligible children in the first five years of the program. To date, a similar portion of eligible children have enrolled in SCHIP indicating barriers remain in reaching the target population of eligible uninsured and underinsured children. CHPlus followed the private model of a statewide health insurance program (Szilagyi, Holl, Rodewald, Shone et al., 2000). 98% of pediatric physicians in the area participated in the CHPlus program and the local health care system was well developed to care for this population of children. CHPlus health care providers experienced

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<sup>3</sup> CSHCN are those children and adolescents who have or are at increased risk of a chronic physical, developmental, behavioral, or emotional condition and who require health related services (McPherson, Arango, & Fox, 1998).

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reimbursement at usual and customary rates similar to the private practice model, and practice style was equivalent to children who had experienced an uninterrupted usual source of care. Therefore, separate SCHIP programs or SCHIP Medicaid expansion programs may not yield similar outcomes. SCHIP programs with a poorer baseline network of pediatric health care providers, local health care system, and varying reimbursement rates may not yield similar results. These differences need to be considered when comparing the results of CHPlus studies to larger national studies examining the SCHIP target population.

In CHPlus and the BlueCHIP/Caring Program, the demographics of the population served was 96% white, with a high school or greater educational level, and most often with both parents in the household employed, thus, a relatively low-risk, generally healthy group of children in low-income, working families. Providing health insurance to this demographic population often presents fewer barriers and yields improved health outcomes than in more diverse populations with lower family income, educational level, and greater barriers to seeking health care services.

### **SCHIP-related State-specific Research Studies**

#### ***CHIRI***

The Children's Health Insurance Research Initiative (CHIRI) began in 1999 as a partnership between the Agency for Healthcare Research and Quality (AHRQ), the David and Lucile Packard Foundation, and the Health Resources and Services Administration (HRSA) to support nine studies of public health insurance programs and health care delivery systems. The purpose of the CHIRI research was to uncover what features in the health care delivery system work best for low-income children, and what type of health



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insurance meets the needs of ethnically diverse, low income children and adolescents, and those with special health care needs. CHIRI aimed to facilitate research highlighting the characteristics of SCHIP enrollees across states, to supply policy makers with information to help improve access to health care for low-income children, and improve the quality of health care services delivered. CHIRI studied low-income children in 5 states (Alabama, Florida, Kansas, Indiana, New York) accounting for ~30% of the SCHIP enrollment in 2001 (Brach et al., 2003). CHIRI investigators established a core survey based on the NHIS and other nationally implemented surveys to assure comparability of data across states (Shone, Dick, & Brach, 2003). The sociodemographic and health status measures included in the survey were also consistent in the data collection. Of the state studies funded, seven studies focused part or all of the analysis on children with special health care needs, and five of the studies focused disparities between minority and non-minority children.

Dick et al. (2004) measured access to care and satisfaction with health care services among three groups of vulnerable children newly enrolled in SCHIP between 2000 and 2001: minority children, children and adolescents with special health care needs (CSHCN), and children who had previously been uninsured. Using a pre-post design, parental interviews were conducted at the time of enrollment on the period 12 months prior to enrollment and then again at 13 months after enrollment to review the first year experience in SCHIP. CHIRI data from three states (Kansas, New York, Florida) with different demographics and different program designs were utilized. Logistic regression modeling was used to generate adjusted rates of care to eliminate the characteristic



differences in the subgroups of children and adolescents to make comparisons within states. Data were not pooled across states, but reported on each state's characteristics.

Enrollment data showed a more multiethnic population than in previous studies particularly in New York State: Black (34% in NY to 11% in KS), Hispanic (47% in NY to 14% in KS) and CSHCN (24% in KS to 14% in NY). The largest portion of uninsured were in New York where 72% of the sample of adolescents were uninsured for part or all of the 12 months prior to enrollment in SCHIP in contrast to Kansas where 33% of children were uninsured prior to enrollment. 12 months after enrollment, adolescents who were previously uninsured in Florida and New York had improvement in usual source of care (71% to 95% in NY,  $P < .01$ ; 81% to 89% in FL,  $P < .01$ ). Findings for usual source of care were statistically significant except in Kansas which reporting a usual source of care remained high before and after enrollment at  $>90\%$ . Any unmet need improved for all children the year following enrollment regardless of prior insurance status (33% to 19% in KS,  $P < .01$ ; 32% to 20% in NY,  $P < .01$ ). The authors also found statistically significant improvement in use of health services and in parental satisfaction with health care services.

Findings by race were statistically significant in some measures. Black children had an improvement in unmet needs in Kansas and New York after SCHIP, but not in Florida (40% to 9%,  $P < .01$ , in KS: 42% to 27%,  $P < .01$ , in NY); and were more likely to have a preventive visit in Florida and New York (67% to 86%,  $P < .01$ , in FL 71% to 82%,  $P < .05$ , in NY). Hispanic children had significant improvement in three out of four measures in New York (usual source of care, unmet need, and parental satisfaction with care), but had no significant improvements in usual source of care and unmet needs in

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Kansas. Interestingly, the proportion of children with a usual source of care was high in both White non-Hispanic and Hispanic children before SCHIP (93% for both groups).

For children and adolescents with special health care needs, the most significant decrease was among adolescents in New York who had the greatest unmet need prior to enrolling in SCHIP (51% to 26%,  $P < .01$ ). After 12 months of continuous enrollment, CSHCN in the sample had a higher proportion of unmet needs than other SCHIP enrollees, particularly in Florida. However, disparities between SCHIP enrollees with special health care needs and other enrollees were eliminated in some access measures (preventive care, rating of health care, and usual source of care).

Study limitations included a low response rate to the surveys among the newly enrolled Hispanic population living in urban centers across the three states, and loss to follow up of 13% to 50% of the population across states in the survey response 12 months after enrollment. This loss to follow up in a pre-post study design could bias results. Nonetheless, the study showed that offering continuous SCHIP coverage to the long-term uninsured eliminated disparities among groups that were common in the 12 months prior to enrollment.

Shone et al. (2003) hypothesized there were differences in health care experience among children newly enrolled in SCHIP associated with race and ethnicity despite living in families within the same income group. To determine differences in health care access and use among White, Black and Hispanic children the year prior to enrollment in SCHIP, the CHIRI investigators collected data from 4 states (AL, NY, FL, KS) using similar methodology from the previous study. Data from KS and NY were stratified by race and ethnicity to assure sufficient statistical power. Hispanics were not included in

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the sample in Alabama due to the small sample size. Measures focused on health care experiences the 12 months prior to enrollment in SCHIP (usual source of care; type of usual source of care; ED visits; continuity of care; mental health visits; preventive, acute and specialty visits). Multivariate analyses were used to control for potential causes of disparity other than race and ethnicity, and to assess whether race and ethnicity independently affected access to care, use of health care services and health status prior to enrollment in SCHIP.

The authors found baseline disparities among racial and ethnic groups prior to enrollment in SCHIP. Black and Hispanic children were more likely to have been uninsured, to lack a usual source of care, and to have poorer health status for the 12 months prior to enrollment in SCHIP as compared to white children. No consistent pattern of use of health care services prior to enrollment in SCHIP emerged among the groups in the four states; however, a significant difference emerged in use of health care services within groups between states (30.8% of Blacks used mental health services in NY compared to 6.4% in KS). In Alabama, a large portion of children had ED visits the year prior to enrollment (60% of Black and White children); however, the rate of ED visits was low in New York among all groups. Parents of minority children were more likely to report their child's health status as fair or poor than parents of white children.

The study results show an independent effect of race on usual source of care and reported health status prior to enrollment in SCHIP. Enrollment of children in public insurance coverage such as SCHIP is often expected to result in a reduction in disparities. SCHIP has a potential role in narrowing disparities among racial and ethnic groups who are continually enrolled in the program, however, program outcomes must be monitored





to assure equal access to care, and use of health care services among groups to make certain disparities are not perpetuated.

Findings from Szilagyi et al. (2003) and Brach et al. (2003) related to CHIRI were presented previously, and highlight the particular challenges of providing quality health care services to children and adolescents with special health care needs and the necessity to consider this population in program design and implementation.

### *Summary of CHIRI Research*

The CHIRI research methodology provided consistency across states in survey design, data collection and health outcome measures, and provides data comparable across states. CHIRI contributes to the body of literature on the characteristics of current SCHIP enrollees, and provides a baseline against which to measure the subsequent impact of SCHIP. The studies presented focused on the 12-month period prior to enrollment which is important for program design and in capturing the SCHIP target population, and a year after enrollment in SCHIP. CHIRI results demonstrated SCHIP has the potential to positively effect vulnerable populations of children and adolescents. When controlling for sociodemographic and health status characteristics, the authors showed vulnerable children enrolled in SCHIP had improved access to and satisfaction with health care services and the benefits were equivalent to other SCHIP enrollees. Although findings can only be generalized to the population of the new SCHIP enrollees in the study states, the 5 states comprise ~30% of the SCHIP enrollment nationally.

In the study on racial and ethnic disparities, Shone et al. (2003) used 'White nonHispanic' as the comparison group or benchmark to measure improvement in health disparities. Several of the measures demonstrated a greater variation within racial and

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ethnic group than between groups indicating further work is needed to find a standard when engaging in health disparities research. The health status variable reportedly differed across studies. Szilagyi et al. (2003) found parents of CSHCN often reported health status of their children as good or excellent even though they have a chronic disability (Szilagyi et al., 2003). Survey questions on health status have different meaning for different racial groups (Shenkman, Vogel, Brooks, Wegener, & Naff, 2001). These results contribute to the body of literature highlighting the need for using multi-item health status questions and multiple valid and reliable instruments as part of survey design when measuring health status among ethnically diverse groups to accurately report changes in health outcomes.

#### *SCHIP in New York*

There are a limited number of studies in the literature which are state-specific and focus on the overall health outcomes of SCHIP enrollees. Dick et al. (2003) published further findings on the characteristics of SCHIP enrollees in NY State as the program transitioned from CHPlus to SCHIP. More black children (9% to 30%) and Hispanic children (16% to 48%) were enrolled in NY SCHIP in 2001 as compared to CHPlus in 1994. More SCHIP enrollees had parents with < high school education, were living in families with incomes < 150% FPL (59% to 75%), and had parents who were not working (7% to 20%). This study was an important follow up to the CHPlus research as health outcomes of SCHIP enrollees may be different from those predicted in the CHPlus studies.

Although there was a significant change in the characteristics of the NY State (NYS) SCHIP enrollees overtime as it transitioned to CHPlus, Szilagyi et al. (2004)

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measured the impact of SCHIP in New York State (NYS) and found an improvement in measures of access and use of health care services similar to the CHPlus findings. The proportion of children with a usual source of care increased (86% to 97%,  $P < .001$ ), and 26% of children changed their usual source of care after enrollment in SCHIP. The rate of preventive visits improved (74% to 82%,  $P < .001$ ), and the proportion of children with unmet health needs was substantially lower (31.1% to 19%,  $P < .001$ ) under SCHIP. There was no statistically significant change in ED visits, and the proportion of children who used their usual source of care for all visits increased (47% to 89%) improving continuity of care. This finding demonstrated a significant change in the pattern of seeking health care among NYS SCHIP enrollees. Overall, improvement in quality of care was reported by parental interview after enrollment in SCHIP (8.0 to 8.7) using a mean rating of health care quality (1-10, 10 being highest), and parents reported a decrease in stress related to lack of health care after enrollment (52% to 46%).

#### *SCHIP in Florida*

Stein, Shenkman, Wegener, and Silver (2003) explored the hypothesis that parents are more likely to enroll children who need care in public insurance programs than parents who do not view their children as potentially needing significant care. The authors tested the hypothesis that children enrolled in SCHIP have more health conditions than the general population of children. The study design utilized a comparison between statewide data obtained in SCHIP enrollees in Florida in 1997 and 1998 and a nationally representative sample from the NHIS Survey taken from 1994 data (Table 3). The NHIS data were analyzed using the income eligibility level for SCHIP, eliminated those

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children receiving Medicaid, and included children whose household income was missing who were non-Medicaid recipients.

Parental telephone interviews were conducted using the Questionnaire for Identifying Children with a Chronic Condition (QuICCC), a validated questionnaire asking about consequences of health conditions in children. The QuICCC was based on the 1994 NHIS Core Interview and Disability Supplement which contained a series of questions about children's functioning and use of health care services. The Florida survey used measures of health status in the NHIS Survey (school absence days, restricted activity days in the previous 2 weeks, bed days, and children's health status using fair/poor, excellent/good). Analyses were conducted examining differences in proportions and ANOVA examining difference in means for the continuous variables.

Thirty-one percent of children enrolled in the Florida SCHIP program were identified as having a chronic health condition compared to 15.9% of the NHIS control sample, and they were three times more likely to have experienced consequences related to their chronic condition (7% to 1.7%,  $P < .01$ ). Florida SCHIP enrollees were more likely to be Hispanic and more than twice as likely to have school absence days as the general population (29% vs. 18%,  $P < .01$ ). There was no difference in overall limitation of activity or health status between the groups. Results from Florida found SCHIP enrollees were not the largely healthy population envisioned, and are more likely to have higher health care use and health care costs than the general population. These findings have implications for the long-term viability of the current SCHIP program.

*North Carolina Health Choice*

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One additional state study is notable for findings in relation to SCHIP and oral health. Mofidi, Slifkin, Freeman, & Silberman (2002) examined the effect of the SCHIP North Carolina's Health Choice program on school age children's access to dental care using enrollee data from 1999 to 2000. Using a pre-post evaluation, parents of enrollees responded to two surveys about their child's access to dental services, usual source of dental care, and unmet dental need in the year prior to enrollment in SCHIP N. C. Health Choice. Sixty-five percent of school age children enrolled in N. C. Health Choice had a visit to a dentist in the previous year compared to 48% prior to enrollment. Unmet dental need decreased from 43% to 18%, and the proportion of children reported to have a usual source of dental care increased to 90% from 77% prior to enrollment. The SCHIP North Carolina model which resembles a private insurance model made a significant impact on access to dental care for school-age children, and potentially will address disparity in oral health with continuous enrollment.

### **SCHIP-related Research Nationally**

There are few studies available evaluating the health outcomes of SCHIP enrollees nationally (Byck, 2000; Guendelman & Pearl, 2004; Newacheck, Park, Brindis, Biehl, & Irwin, 2004). Guendelman and Pearl (2004) studied the effect of offering public health insurance coverage to parents on children's access to care and use of health care services. The sample consisted of three groups: child and parent insured, child insured/parent uninsured, and child and parent uninsured. Under SCHIP expansions, parents in some states were offered public health insurance coverage with various eligibility requirements and benefits. Data from the NHIS 2000 were used to study a random probability sample of children and parents.

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The authors found children with Medicaid or SCHIP living in families with no family coverage experienced more barriers to access and use of health care services than children living in families where the parent and child were both insured. They were more likely to experience a delay in seeking health care because of financial constraints (19% greater probability of delaying care); had a greater likelihood of having one or more unmet health need (20% greater probability); and a 25% higher probability of having no usual source of care. These findings are consistent with the New York State studies on health outcomes of CHPlus and SCHIP enrollees. The authors found extending coverage to uninsured, low-income parents improved their ability to obtain regular medical care in a private office or HMO and avoided gaps in insurance coverage that lead to delays in seeking care. Family coverage under SCHIP has the potential overtime to narrow disparities in access to care among children living in low-income families.

A small number of national studies have presented a profile of the characteristics of current SCHIP enrollees (Brach et al., 2003; Byck, 2000; Guendelman & Pearl, 2004). Byck (2000) found SCHIP-eligible children have different sociodemographic and health status characteristics than Medicaid-enrolled and privately insured children. A majority of SCHIP-eligible children live with both parents (79.9%) and live in families where the head of household has a least a high school education (81.7%) and at least one parent is employed (91.2%). SCHIP parents are disproportionately employed in areas with low levels of health insurance coverage or are self-employed (14.6% to 8.2% in families with private coverage). SCHIP children are 2 times more likely to be adolescent and 1.5 times more likely to be in excellent health than Medicaid-eligible children. Compared to privately insured children, SCHIP-eligible children are almost 3 times more likely to be

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Hispanic and 2 times from likely to be in poorer health than children living in families with private insurance.

Interestingly, this profile is consistent with the earliest CHPlus findings in NYS presented previously, but is in contrast to the later findings in NYS as the program matured and transitioned to NY SCHIP. It is also in contrast with the CHIRI data gathered on SCHIP enrollees and their families who had continuous enrollment in the program. Regardless, the study results are important for policy makers in the redesign and reauthorization of SCHIP. Families who are at the higher end of the income eligibility for SCHIP have generally had lower take-up rates (Dubay & Kenney, 2001; Selden, Banthin, & Cohen, 1999). In states with Medicaid expansion programs, enrollment has been challenging in part due to the stigma attached to Medicaid for educated and employed parents (Byck, 2000).

Several trend analyses evaluating the impact of SCHIP expansions nationally have provided evidence on a decline in the proportion of children and adolescents who are uninsured (Cunningham, 2001; Cunningham, Hadley, & Reschovsky, 2002a; Cunningham, Reschovsky, & Hadley, 2002; Lo Sasso & Buchmueller, 2004; Newacheck, Park, Brindis, Biehl, & Irwin, 2004). Cunningham and colleagues found increases in eligibility in public coverage through SCHIP and Medicaid did decrease the likelihood of being uninsured for the target income group of children living in families with incomes between 100% and 200% of the FPL (14% in 1996 to 21% in 1999) (Cunningham, Hadley, & Reschovsky, 2002b). However, this net gain in public coverage increased the likelihood of having public coverage versus private coverage indicating SCHIP expansions resulted in some substitution of public for private insurance among families in

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the target income group (Cunningham, Reschovsky, & Hadley, 2002). Estimates in one study showed crowd-out of private health insurance to be nearly 50% (Lo Sasso & Buchmueller, 2004). Newacheck, Park, Brindis et al. (2004) found the proportion of adolescents without insurance across income groups nationally declined overall from 14.1% to 12.2% between 1995 and 2002. Adolescents in poor families without insurance coverage showed the largest decline from 27.4% in 1995 to 19.7% in 2002. A larger decline in the proportion of adolescents who were uninsured would have occurred except for the significant reduction in private insurance coverage which occurred for adolescent living in families with middle and higher incomes.

## **Discussion**

The SCHIP legislation was motivated by the belief that expanding health insurance coverage increases utilization of preventive medical services and improves the health of low-income children and families (Kaestner, Joyce, & Racine, 2001). This literature review highlighted differences in characteristics of SCHIP enrollees overtime and presented a profile of the evidence on the variation in health outcomes among all children and adolescents and particular ethnic and racial groups of children enrolled in SCHIP. The state-specific studies reviewed which utilized SCHIP enrollee data presented the strongest evidence that SCHIP was meeting the goals of insuring the target population of children and families. However, the lack of national trend studies on children enrolled in SCHIP leaves a gap in the literature and insufficient evidence on national trends for policy makers facing reauthorization of SCHIP in 2007.

The CHIRI initiative demonstrated significant collaboration in data collection. CHIRI researchers used sound methodology including analyzing SCHIP enrollment data,

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interviewing parents of SCHIP enrollees, and performing medical chart reviews in community settings to validate findings. This correlation of parent/child data and validation of data by several sources yields results with minimal threats to reliability and validity. However, even in this collaborative model, state data were not pooled but comparisons were made among outcome measures within states and between states. This is effective for evaluating program design and improvements in child and adolescent health within states but leaves a gap for federal policy makers in evaluating the success of the program as a whole.

The CHIRI findings on vulnerable groups of children and adolescents highlighted that when controlling for sociodemographic characteristics and health status, providing health insurance eliminated disparities in access to care and use of health care services. However, providing health insurance coverage to vulnerable groups with different characteristics, different levels of family income, and those living in single-parent families with lower educational levels may yield different results (Dick et al., 2004).

The SCHIP legislation requires states to report on efforts to reduce the number of uninsured children and adolescents, but does not suggest any goals for health outcomes in the target population (Starfield, 2000). States are left to establish SCHIP quality measures as part of the program design. As reported previously, states have found annual reporting on enrollment data challenging and most states have not addressed quality measures or benchmarks for quality measures within the SCHIP program structure. Measures of access to care and use of health care services do not address the quality of the services delivered which have a significant impact on overall health outcomes for children and adolescents.

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## Conclusion

Significant challenges remain for researchers evaluating the health outcomes of SCHIP enrollees. The variation in program design, eligibility and benefits and the lack of target quality guidelines are just a few of the challenges facing researchers in designing federal evaluation studies. Factors associated with children's access to care and utilization of health care services are not fully understood, and significant limitations in survey instruments hinder researchers.

Further health services research is needed on access and utilization patterns under SCHIP to guide policymakers in program design, particularly in the target population of children living in low-income families with incomes <200% of the FPL and in evaluating improvements in children's health and reduction in health disparities among ethnically diverse and vulnerable populations. Researchers face challenges in designing survey instruments sensitive to the incremental changes in health status among children and adolescents, and in establishing measures sensitive to the developmental variations in the pediatric population.

Healthy children make healthy adults, and it is in the best interest of the public to design programs which offer access to care without barriers and encourage appropriate utilization of health care services fostering health maintenance. Providing policy makers with evidence about what types of programs are most effective and demonstrate the best health outcomes for the pediatric population remains the goal of health services research. Continuing to design research to evaluate SCHIP as a demonstration program is a valuable investment in the future of children.

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The image shows a vertical strip of a document, possibly a page from a book or manuscript. The text is partially obscured by a dark, irregular shape in the center. The visible text includes the words "UNIVERSITY OF CALIFORNIA" and "BR" repeated in a pattern. The text is printed in a serif font, and the overall appearance is that of a historical document.

Health Insurance Program (SCHIP): Patient characteristics and health care needs.

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A vertical strip of a document, likely a page from a book or a document, showing a repeating pattern of the word "FRANZ" and a small square symbol. The text is printed in a serif font, and the pattern repeats vertically. The strip is narrow and appears to be a detail from a larger page.

## *Chapter 3*

### *Adaptation and Use of a Theoretical Framework*

Access to medical care for children living in low-income families has been the subject of numerous investigations in recent years (Cunningham, Hadley, & Reschovsky, 2002b; Cunningham & Kirby, 2004; Newacheck, Hughes, Hung, Wong, & Stoddard, 2000; Newacheck, Park, Brindis, Biehl, & Irwin, 2004; Newacheck, Stoddard, Hughes, & Pearl, 1998; Szilagyi et al., 2004; Szilagyi, Zwanziger et al., 2000). This work has documented a significant increase in the number of children who lack health insurance, who experience delays in obtaining needed care, who have gaps in the receipt of preventive well child care and dental care, who have hospitalizations for conditions sensitive to the receipt of ambulatory care services, and the number of children with special health care needs who lack a regular source of care (Gadomski, Jenkins, & Nichols, 1998; Newacheck, Hughes, Hung, Wong, & Stoddard, 2000; Newacheck, Strickland, & Shonkoff, 1998; Stein, Shenkman, Wegener, & Silver, 2003; Szilagyi et al., 2003; Ullman, Gruen, & Holohan, 1998). These findings indicate that children, as a *vulnerable population*<sup>1</sup>, remain at risk for less than optimum health outcomes. The need to depend on others for access to care and to seek health care services adds to their vulnerability.

Numerous factors impact the health outcomes of children. Age, socioeconomic status, insurance status, family structure, parental education, race and ethnicity, and cultural beliefs are some of the factors which contribute to the health and health risks of children. Parental factors such as social support, social status and productive potential, as well as community factors such as availability of quality health care services further contribute to health risks and create inequities in health outcomes (Aday, 2001).

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<sup>1</sup> Vulnerable populations include children and adolescents, minorities populations, undocumented immigrants, mentally and chronically ill individuals, homeless and disabled populations, and the elderly (Aday, 2001)



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This chapter provides an overview of Andersen's Behavioral Model of Health Services Use, explores the development of the model to predict health outcomes, and the adaptation of the model to vulnerable populations. The review presents a critical analysis of Andersen's model as it applies to health service's research in children, and a rationale for the application of the Andersen et al. (2002) framework to study the impact of public health insurance expansions on children's access and use of care.

## **Andersen's Model**

### *Historical perspective*

Andersen (1968) developed *The Behavioral Model of Health Services Use* to assist in understanding why families use health care services and to assist researchers in defining and measuring equitable access to health care. Andersen focused initially on the family as the unit of analysis in the model with the idea that "the medical care an individual receives is certainly the function of demographic, social, and economic characteristics of the family" (pg.1) (Andersen, 1995). Andersen shifted his unit of analysis to the individual due to the difficulty of developing measures which accounted for the difference in health status among family members. He chose rather to use the characteristics of the family as a predictor for the health seeking behavior of the individual (Figure 1). The original model proposes that an individual's use of health services is the function of their predisposition to use services, factors which enable or impede the use of health care services, and the individual's need for care.

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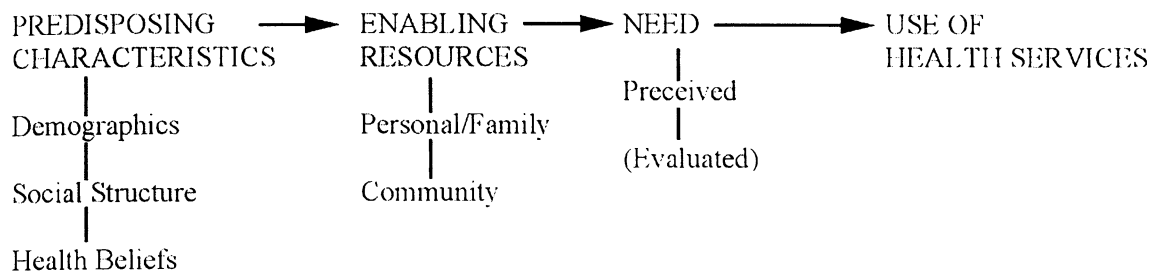
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**Figure 1**  
**The Behavioral Model of Health Services Use (1968)**



### *Theoretical Framework*

Andersen operationally presented *predisposing factors* as demographic (age and gender); social structure (education, occupation, and ethnicity); and health beliefs (attitudes, values, and knowledge about health and health care services) (Andersen, 1968). Social structure represented a range of factors reflecting the status of an individual in the community, the ability of the individual to cope with health problems that present, available resources to deal with the health problems, and how the physical environment impacts the health of the individual. Issues of culture, social networks and interactions were not included in social structure in the original model. Health beliefs were seen as influencing the need for health care and use of health care services, but the influence of health beliefs on enabling resources was not weighted in the original model.

*Enabling factors* included both personal/family and community enabling resources. Health care facilities and health care providers must be available in the community to enable use of services. Income, health insurance, a usual source of care, travel time and waiting periods are enabling factors and can all impact use of health care services. Social support was implied in the original model by including family under

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enabling resources, but it was not addressed due to the challenges presented in measurement. Family size is addressed in subsequent work.

Andersen (1968) conceptualized *need* as a primary predictor of use of health care services. 'Perceived need' predicts care-seeking behaviors and adherence to a medical regimen. 'Evaluated need' represents professional judgment about an individual's health status and their necessity for medical care, and is conceptualized as a secondary component in the original model (Andersen, Kravitis, & Anderson, 1975).

There has been controversy since the introduction of the model as to whether the intent was to explain the use of health seeking behaviors or predict them (Andersen, 1995). Andersen conceptualized the model to both explain and predict the use of health care services. Each component of the model contributes to the possible use of health services by the individual, and the model as a whole explained the process by which an individual chooses to seek care. The original model did not focus on health outcomes, but use of health care services measured by the number of doctor visits, hospitalizations, and use of dental services. The measures were chosen to explain use and were seen as influenced by need and the predisposing characteristics of the individual. Interestingly, dental services were thought to be significantly influenced by social structure, health beliefs and enabling factors rather than need which may reflect the greater emphasis on treatment rather than prevention when the original model was conceptualized (Andersen, 1995).

#### *Revisions of the Andersen Model*

The Behavioral Model of Health Services Use has been tested, revised, and adapted by Andersen and colleagues in health services research (Aday & Andersen,

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1974; Aday & Awe, 1997; Andersen et al., 2002; Gelberg, Andersen, & Leake, 2000).

Aday and Andersen (1974) broadened the concepts of access and use in the model

(Figure 2). They included the influence of health policy and the health care system as

key determinants of access. The addition of these two variables in the model

acknowledged the importance of environmental or community factors in determining the

use of health care services. The organization and structure of the health care system was

predictive of the patterns of use in the population over time. Environmental factors (type,

site, purpose, time interval) were added to enabling resources in the model, and consumer

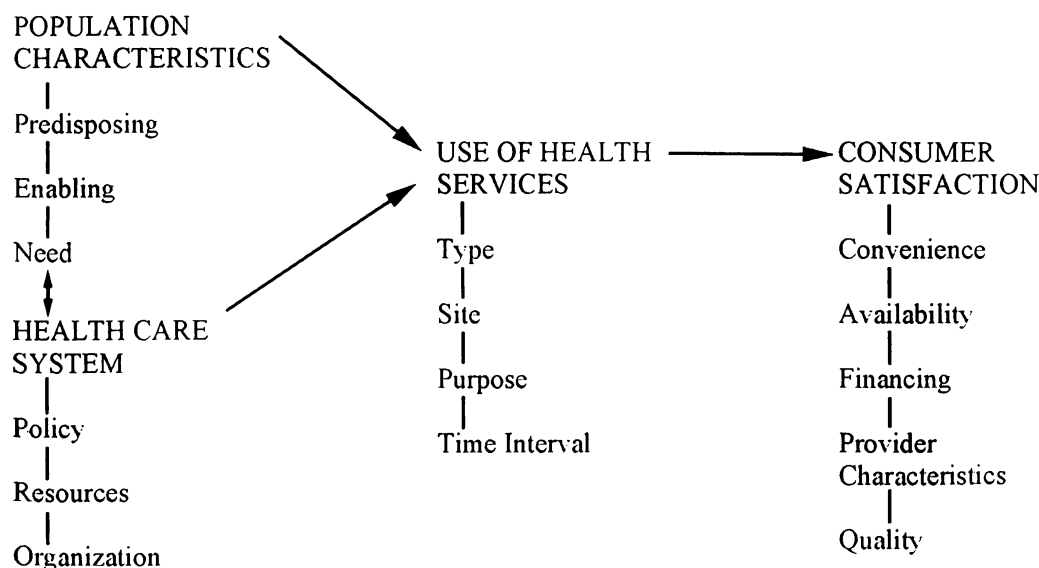
satisfaction was established as the initial component of health outcomes. The expansion

of the model to include health outcomes was an important recognition of the importance

of sound health policy which leads to use of health care services resulting in improved

health of aggregate populations in the community.

**Figure 2**  
**The Behavioral Model of Health Services Use (1974)**



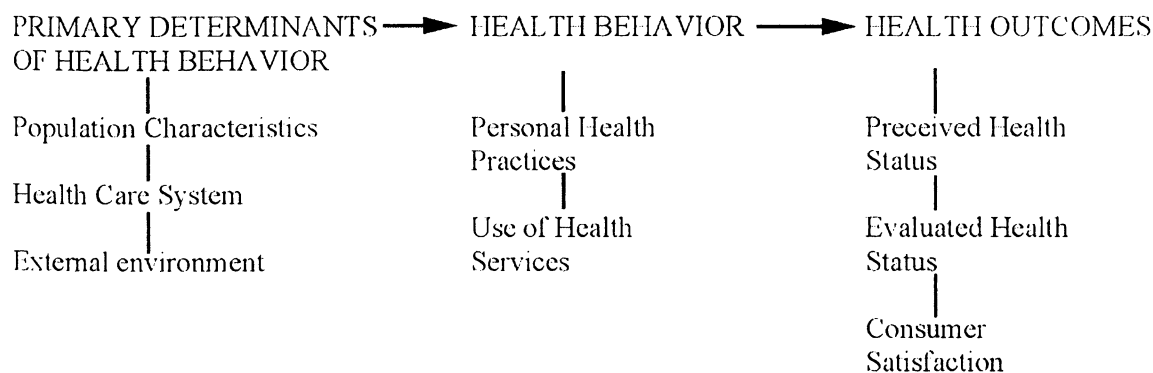


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Health status was later introduced into the Andersen model as a measure of health outcomes (Andersen, Davidson, & Ganz, 1994) (Figure 3). The addition of this concept established that the use of health services is explicitly for improving and maintaining the health of the population, and expanded the Andersen model beyond predicting use to examining the outcome of use. Two additional variables in the model are important to this review- external environment and personal health practices- as they impact populations at risk, particularly children. Environment (physical, political, economic) as defined by Andersen et al. (1994) is a key determinant of children's health, and personal health practices within the family (diet, exercise, and self care) influence need, use of health care services, and the health outcomes of children.

**Figure 3**  
**The Behavioral Model of Health Services Use (1994)**



This expansion of the model further operationalized the concepts of access and use to include the dimensions of 'effective access' and 'efficient access' which are important to state and federal health policy and health care reforms. 'Effective access' is established when use improves health outcomes, and 'efficient access' is demonstrated

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when health status improves in a population relative to the amount of resources required to produce improvements (Aday, Begley, Lairson, & Slater, 1998). This phase of the model set the stage for evaluating the fairness and effectiveness of the health care system and for addressing the concept of 'equity'. 'Equity' is concerned with health disparities and is complementary to the dimensions of effectiveness and efficiency. The ultimate test of equity is the extent to which inequalities exist within aggregate populations (Aday, Begley, Lairson, & Slater, 1998). These factors set the stage for Aday's subsequent work on vulnerable populations.

### **Adaptation to Vulnerable Populations**

Vulnerable populations face particular challenges in obtaining health care services. Vulnerable populations are at risk for poor physical, psychological, and/or social health outcomes (Aday, 2001). Understanding what factors contribute to improved access and use allows for the design of programs that meet the needs of the particular population to be served.

Gelberg, Andersen, and Leake (2000) and others adapted the Behavioral Model of Health Services Use for studying vulnerable populations which consider both individual and community characteristics that contribute to health and health care in this population (Aday, 2001; Andersen, Rice, & Kominski, 2001; Andersen et al., 2002; Gelberg, Andersen, & Leake, 2000). The *Behavioral Model for Vulnerable Populations* was designed specifically to predict use of health care services among homeless adults (Figure 4). The expanded model identifies factors that make homeless populations and others vulnerable and may affect their use of health care services and health status. The addition of a *vulnerable domain* to the model provides insights into how predisposing, enabling,

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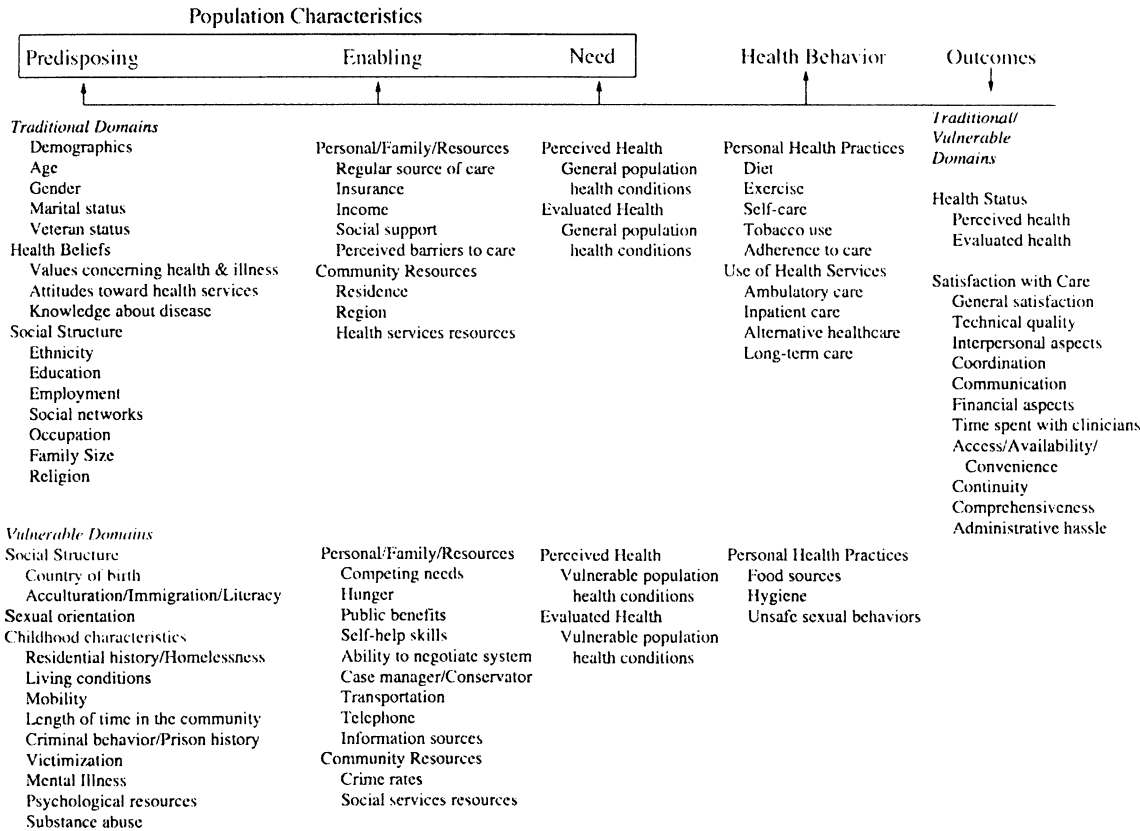
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and need factors contribute to use and health status. The model examines the effect of use on health status and health outcomes.

**Figure 4**  
**The Behavioral Model for Vulnerable Populations (2000)**



The *Vulnerable Domain* includes the issue of *competing need* as an enabling factor. *Competing need* is thought to be a significant contributing factor to access and use of health care services in children living in low-income families. The influence of *competing need* had not been previously considered in models of health outcomes research. This factor and others in the model including food sources and hygiene are significant contributors to the health status of children, and make it a useful model for predicting health outcomes in this vulnerable population.



Andersen's recent work encompasses a more comprehensive perspective to access emphasizing the health outcomes of use of health care services, the effectiveness of use measured by improvement in health status and satisfaction with health care services, and the efficiency in the health care system as measured by the cost burden of an improvement in health outcomes (Andersen, 1998). This work is in contrast to the initial models presented in this review which focused on the determinants of the use of health services.

#### *Adaptation to Children Living in Low-Income Families*

Recently, Andersen and colleagues have tested adaptations of the *Behavioral Model of Health Services Use* in vulnerable populations of lower-income adults, children and homeless women (Andersen et al., 2002; Brown et al., 2004; Davidson, Andersen, Wyn, & Brown, 2004; J. H. Lewis, R. M. Andersen, & L. Gelberg, 2003; Lim, Andersen, Leake, Cunningham, & Gelberg, 2002). This body of work has further operationalized the factors in the Andersen model which predict access and use.

Andersen et al. (2002) presented a comprehensive theoretical approach to understanding the impact of community-level variables on access to care. The model stresses contextual variables within a community (demand, support, structure, and market dynamics) that significantly impact access to primary care, and further classifies the impact of the factors within specific geographic areas by utilizing metropolitan statistical area (MSA) data (Figure 5). The model was tested using data from the 1995 and 1996 National Health Interview Survey (NHIS) on children (0 to 18 years of age) and adults (19 to 64 years of age). Analyses focused specifically on a single outcome variable (receipt of physician services in the past 12 months). The authors hypothesized that

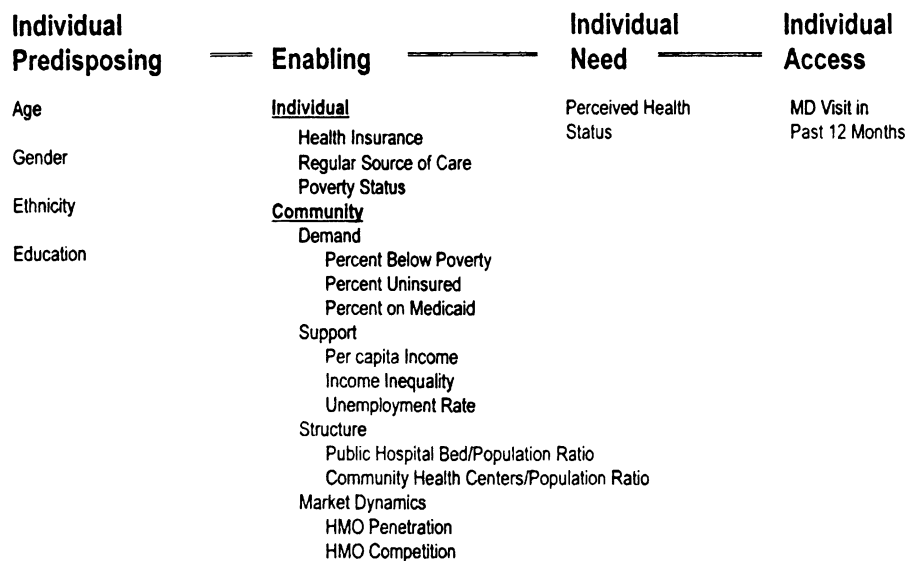


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individual enabling variables (health insurance and a regular source of care) would improve the odds of having a physician visit in the previous 12 months. In the case of children, they considered poverty status an enabling factor for the receipt of health insurance.

**Figure 5**  
**Individual & Community Predictors of Access to Medical Care for Low-Income Populations (2002)**



The authors found the individual characteristics of having health insurance and a regular source of care together with the community characteristic of an individual living in metropolitan statistical area (MSA) with more federally-funded health centers improved the rate of access to care for low-income adults and children. The study results also showed low-income persons with Medicaid had greater odds of getting care than those with private insurance, and children living in families with incomes between 100% and 150% of the FPL had significantly lower odds of having a physician visit than children with incomes between 200% and 250% of the FPL. For community enabling resources, children living in low-income families in areas with higher HMO penetration

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Figure 1. Schematic representation of the experimental design. The subjects were divided into two groups: a control group and an experimental group. The control group received a standard diet, while the experimental group received a diet supplemented with 10% of the total energy from fat. The subjects were then divided into two subgroups: a control subgroup and an experimental subgroup. The control subgroup received a standard diet, while the experimental subgroup received a diet supplemented with 10% of the total energy from fat. The subjects were then divided into two subgroups: a control subgroup and an experimental subgroup. The control subgroup received a standard diet, while the experimental subgroup received a diet supplemented with 10% of the total energy from fat.

and competition had significantly lower odds of having a physician visit in the previous year. However, a higher per capita income and a greater supply of health facilities and safety net providers in a community increased the odds of children from low-income families having a physician visit.

This study presents a theoretical model and methodology for examining predisposing and enabling factors which contribute to the use of health care services among children living in low-income families. The study further challenges local program design for vulnerable populations by using the data from the NHIS to rank MSAs (29 metropolitan areas) according to medical care access, adjusting for the predisposing and need characteristics of these populations. The study methods highlight communities with large proportions of children living in low-income families who are at greater risk for poor health outcomes. This theoretical framework assesses the importance of community as well as individual variables that enable access to health care services for low-income adults and children living in low-income families.

### **Andersen's Model & Child Health Outcomes**

Andersen's Behavioral Model of Health Services Use has been the model used as the basis for empirical analysis in the child health policy literature and in evaluating the impact of access to care on children's health (Cohen & Bloom, 2005; Cunningham, Hadley, & Reschovsky, 2002a, 2002b; Lave et al., 1998; Newacheck, Park, Brindis, Biehl, & Irwin, 2004; Newacheck, Stoddard, Hughes, & Pearl, 1998; Szilagyi, Holl et al., 2000; Szilagyi, Zwanziger et al., 2000). Andersen and colleagues and others have further operationalized the model and extended the community-level variables to include vulnerable population (Aday, 2001; Andersen & Davidson, 2001; Brown et al., 2004;

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Davidson, Andersen, Wyn, & Brown, 2004). However, there are relatively few papers that build on the theoretical aspects of the original model and focus solely on health services research in children and vulnerable populations (Halfon, Inkelas, & Wood, 1995; J. H. Lewis, R. M. Andersen, & L. Gelberg, 2003; Lim, Andersen, Leake, W., & Gelberg, 2002; Raghavan et al., 2005).

Gelberg, Andersen, and Leake (2000) contributed to the conceptual understanding of the predisposing, enabling, and need factors which explain vulnerability. Aday (2001) and subsequent work has contributed to the understanding of factors which predict vulnerability within aggregate populations including infants and young children. However, the complexity in the Aday (2001) *Framework for Studying Vulnerable Populations* and others goes well beyond valid measures used in available data sources such as the NHIS. Longitudinal measures would be required for many of the variables proposed in the models. If concepts presented in this framework and others could be reliably measured overtime and applied to program design, the ability to measure potential and realized access and the potential to ameliorate disparities would be improved. However, due to limited measures of complex variables, current work in the field of health outcomes research in children generally utilizes an adaptation of the Andersen et al. (2002) model (Figure 5).

### **Adaptation to Measuring Child Health**

To support the theoretical underpinning of this dissertation, the operational measures of *Individual Access* in the Andersen et al. (2002) model are expanded to include measures utilized in existing national, publicly available databases specific to child health outcomes. Variables of preventive well child care (no preventive well child

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visit in past 12 months, usual source of care) and preventive dental care (no dental visit in past 12 months) are added to the domain of *Individual Access* to more accurately reflect measures available in the NHIS currently used to evaluate child health.

### **Gaps in the Andersen Model**

Although the proposed adaptation of the Andersen et al.(2002) model increases the scope of the model in regard to child health outcomes, gaps remain in the conceptual model in addressing the unique needs of children as users of health care services. Incorporating a developmental perspective in the framework for the utilization of health services would improve the design in predicting use of health care services in children and adolescents. Development is dynamic in the pediatric population and is predictive of need for and use of health care services.

Primary prevention has been the cornerstone of improved outcomes in children's health, and children benefit most from primary prevention efforts during particular periods of growth and development. Global surveys present morbidity and mortality statistics in underdeveloped countries with significantly higher rates of morbidity and mortality among the pediatric population in areas without receipt of primary health care services (WHO, 2004). Therefore, children deserve the most attention during key developmental stages, and the framework would benefit from the inclusion of 'developmental stage' as a predisposing and need variable.

Further research is also needed to identify environmental health factors and additional *predisposing* and *need* factors unique to children living in low-income families that contribute to use of health care services and overall child health.



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## Conclusion

Further understanding the predictors of health care use in children living in low-income families remains an important endeavor. The ability to predict factors that impact health care use and the ability to measure the importance or contribution of particular factors in seeking health care services informs policy and is critical to the design, cost-effectiveness, and equity of public insurance programs. Access to care and the use of quality health care services will determine the health of the next generation of Americans. To date, Andersen's model provides researchers the best theoretical underpinning for understanding the factors that predict children's health and contribute to overall health outcomes.

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## Part II

### The Impact of Public Health Insurance Programs on Children's Health

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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

## *Chapter 4*

### *The Impact of Public Insurance Programs on Children's Access and Use*



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This image shows a blank, aged, cream-colored page, likely an endpaper or flyleaf of a book. The paper has a slightly textured appearance with some minor creases and discoloration. On the left edge, there is a dark binding strip with gold lettering and decorative elements. The right edge shows the binding structure, including a vertical strip of gold lettering and a small, dark, rectangular label near the top.

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**Title: The Impact of Public Insurance Expansions on Children's Access and Use of  
Care<sup>1</sup>**

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Abbreviations: SCHIP-State Children's Health Insurance Program; FPL-federal poverty level; NHIS-National Health Interview Survey; FY-fiscal year; NCHS-National Center for Health Statistics.

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<sup>1</sup> This study was supported by funding provided by the Centers for Disease Control and Prevention (CDC/ATPM Cooperative Agreement TS-0842). Additional funding was provided by a cooperative agreement from CAN-DO: Center to Address Disparities in Children's Oral Health, sponsored by the National Institute for Dental and Craniofacial Research and the National Center on Minority Health Disparities at the National Institute of Health (U54 DE14251).

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## **Abstract**

**Background.** Since the enactment of the State Children's Health Insurance Program (SCHIP), children living in low-income families who were previously uninsured have gained access to health care. Researchers in several states have studied the health of children enrolled in SCHIP and have demonstrated improved access and increases in the proportion of care taking place within a usual source of care. Changes in health care access and use following implementation of SCHIP have been documented in several states, but few studies have addressed these outcomes from a national perspective.

**Objective.** To examine the impact of the State Children's Health Insurance Program (SCHIP) nationally on children's access and use of health care services.

**Data Source.** The National Health Interview Survey (NHIS), using 1997 as a baseline which predates the implementation of SCHIP and 2003 as the endpoint of the analysis.

**Study Design.** The study used a cross sectional design to examine changes in health care access and utilization for children in the SCHIP target population, defined here as those living in families with incomes between 100% and 199% of the federal poverty level, before and after the implementation of SCHIP. The baseline analysis reflects the experience of uninsured or underinsured children in the target population prior to the enactment of SCHIP and the endpoint reflects the experience of children in the target group six years after the implementation of SCHIP. We compare changes in access and utilization for these children to two comparison groups: children living below poverty and children living at or above 200 % of the federal poverty level.

**Outcome measures.** Access measures include unmet health needs, delays in seeking health care, and absence of a usual source of care. Utilization measures include interval

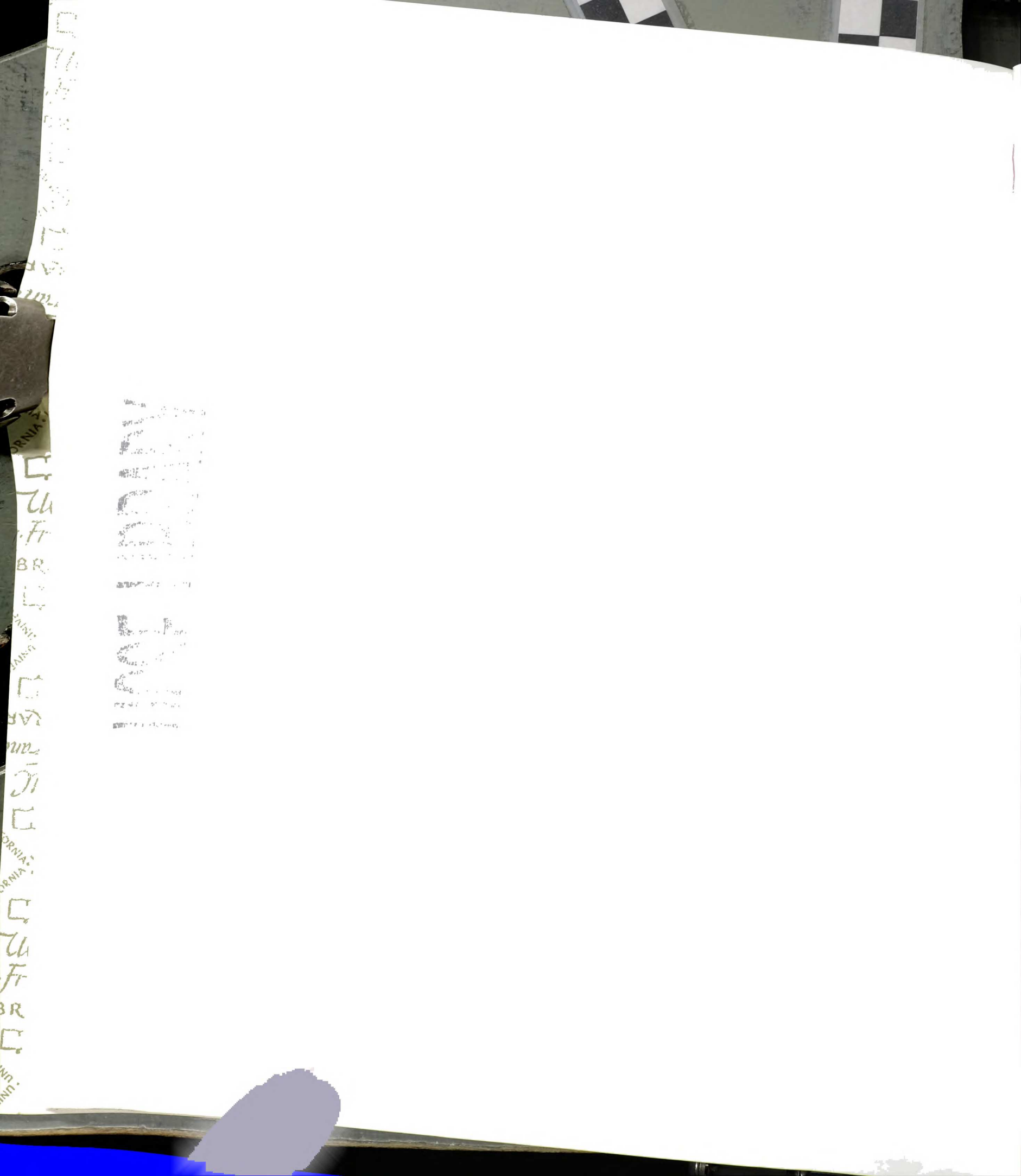


since last provider visit, average annual number of provider visits, receipt of well child care and preventive dental care, hospital admissions, and annual number of hospital days.

**Data Analysis.** Our analysis included 25,734 children 0 to 18 years of age (1997 and 2003 combined). Analysis included bivariate testing comparing the period one-year prior to the implementation of SCHIP to the endpoint at six-years after implementation of the program. Multivariable models were used to control for confounding variables including child's age, gender, race and ethnicity, family structure, family income, region and place of residence, parental education, health insurance, and parental report of health status.

**Results.** Children in the SCHIP target income group, showed the largest percentage reduction in rates of uninsurance among three income groups (<100%, 100-199%, and >200% FPL) between 1997 and 2003 (15.1% to 8.7%;  $P < .001$ ). Significant reductions occurred in the proportion of children without a usual source of care in the target income group (9.4% in 1997 to 7.3% in 2003,  $P < .05$ ). There was also a significant reduction in the proportion of children without a provider visit in the past year, from 10.8% in 1997 to 9.8% in 2003 ( $P < .05$ ). Other measures showed no significant changes over this time period. However, a separate multivariate analysis restricted to the SCHIP target population in 2003 showed that children with continuous public coverage had significantly better access and utilization on all measures studied when compared to uninsured children, and had significantly higher rates of provider visits, well child care and preventive dental care when compared to children with continuous private coverage.

**Conclusions:** SCHIP has been highly successful in reducing the number of uninsured children in the U.S. since its introduction. Implementation of SCHIP is associated with substantial gains in public coverage for children in the target income group. Although



some of the gains were offset by losses in private coverage, our findings demonstrate that public health insurance is a significant protective factor for children living in the target income group.

**Key Words:** Insurance, Medicaid, SCHIP; access, utilization





## **The Impact of Public Insurance Expansions on Children's Access and Use of Care**

The State Children's Health Insurance Program (SCHIP) enacted in 1997 represents the largest single expansion of health insurance coverage for children in the United States in more than 30 years.(1) In 1997, there were more than 11 million uninsured children in the US representing 15% of the pediatric population.(2) SCHIP was established to reduce the number of uninsured children and targets children from birth to 18 years of age primarily living in near poor families whose incomes exceed Medicaid eligibility limits but fall below 200% of Federal Poverty Level (FPL).<sup>2</sup>

The Balanced Budget Act of 1997 which created SCHIP allocated \$40 billion over ten years to extend coverage to low-income, uninsured children ineligible for Medicaid.(4) The SCHIP legislation allowed states to provide coverage by expanding their existing Medicaid program, creating a freestanding separate insurance program more like employer-sponsored private insurance, or a combination of these approaches. States that chose to expand their Medicaid program were required to adhere to the eligibility and benefits required under existing federal Medicaid regulations. States that created separate programs were allowed greater flexibility in program eligibility, benefits, and cost-sharing, and could design benefit packages less generous than required under Medicaid.

Initial federal eligibility requirements were designed to cover up to 5 million of the more than 11 million uninsured children. By the completion of fiscal year (FY) 2003, the number of children ever enrolled in SCHIP rose to 5.8 million.(5) Enrollment has

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<sup>2</sup> A yearly income of \$14,995 for a family of four was the FPL guideline when SCHIP was established. Poverty level in 2005 is expressed as a yearly income of \$19,350 for a family of four (DHHS, 2005). States commonly use 200% of the FPL as the cap for SCHIP eligibility though some states set slightly higher or lower limits.

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grown most rapidly in those states that chose to create separate SCHIP programs. Thirty-five states are currently operating either separate SCHIP programs or a combination of separate SCHIP and Medicaid expansion programs.(5) Although Medicaid serves many more children than SCHIP, the enhanced level of federal matching funds along with the state autonomy allowed in program design and implementation has generated considerable interest and support for SCHIP among states.(6)

The SCHIP legislation was motivated by the belief that expanding health insurance coverage would increase access to health care services, raise the use of preventive medical services, and improve the health of children.(7) Uninsured children have decreased access to health care services, often use more expensive medical services and have more serious health problems than children in privately or publicly insured programs.(8, 9) Uninsured children are more likely to lack a usual source of care, to have unmet health needs, to delay seeking health care, to have lower immunization rates and use fewer well child care services than insured children.(10, 11) Measuring the impact of health insurance on health has proved challenging for researchers.(11-13)

Recent state studies following the implementation of SCHIP have reported improvements in access to care, changes in the patterns of health care with a greater proportion of health care provided within the usual source of primary care, and improved continuity and quality of care for children in the target group.(14-17) These state level analyses were based on interviews with parents of SCHIP enrollees in large and small states and demonstrate a larger effect than found in national samples.(18, 19) Although encouraging, the level of unmet health needs remained high (18.8% in the New York State) even after SCHIP.(16)

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The purpose of this article is to present an analysis of data from the National Health Interview Survey (NHIS) examining the impact of SCHIP on children's access to care and utilization of health care services. This is the first study to assess trends in coverage, access and utilization for the SCHIP target population using nationally representative survey data. We used 1997 data, which predates the implementation of SCHIP, as the baseline for our analyses, and 2003 as the endpoint of the analysis. Our study also uses a broad set of access and utilization measures from the NHIS that are not available in other data sets. We hypothesized that at the six-year point, the SCHIP target population of children in families with incomes between 100% and 199% of the FPL would experience greater improvements in access and utilization compared to their peers in higher income groups. We also expected to see gains in access and utilization for children living in poor families (incomes less than 100% of the FPL) for two reasons. First, the final phase-in of Medicaid eligibility requiring all states to provide coverage to 100% of the FPL occurred during the study period. Second, SCHIP enrollment efforts had a halo effect, such that the outreach activities for SCHIP often resulted in increased rates of Medicaid enrollment by children with family incomes below the SCHIP income eligibility floor.

## **Methods**

### *Data Source*

The NHIS is a continuing nationally representative household survey sponsored by the National Center for Health Statistics (NCHS).(20) The annual sample includes approximately 40,000 households with approximately 30,000 children under 18 years of



age.(21) Trained personnel from the US Bureau of the Census conduct face to face interviews with an adult caretaker, usually the mother, who provides proxy responses for children less than 17 years of age in the survey. Seventeen year olds were permitted to respond for themselves. The survey instrument was redesigned in 1997 and consists of core questionnaires for household, family, person and child. We used data from the 1997 and 2003 family core files and sample child files for children under 18 years of age for our SCHIP analysis. Missing income data is a problem in all household surveys. To address this issue, NCHS has developed a set of data files with imputed values for cases with missing income data. We used these files in our analysis.

The sample included 13,579 children in 1997 and 11,900 children in 2003. The final response rates for the 1997 sample child and family surveys were 84.1% and 90.3% respectively; the respective response rates for 2003 were 81.1% and 87.9%. Table 1 reports sample sizes and weighted national population estimates.

### *Theoretical Model*

Andersen's Behavioral Model of Health Services Use was utilized as the conceptual framework for selecting independent variables for our multivariate analysis of access to care and utilization of healthcare services.(22) The Andersen model postulates the use of health services as being dependent upon factors of an individual's predisposition to use the health services, the individual's level of need for health services, and the presence of factors that enable or facilitate the use of health care services.

### *Independent Variables*

The predisposing factors included in our analysis were age, gender, race and ethnicity, family structure, family size, and education of the family reference person in





the household. Measures of need included perceived health status, and enabling factors included poverty status, health insurance status, region and place of residence.

### *Measures of Access and Utilization*

We used the sample child data to obtain information on access to health care as indicated by the presence of one or more unmet health needs (including prescription costs, mental health and dental care costs), a delay in seeking health care services, and absence of a usual source of care. For information on the use of health care services, data from the sample child and family core provided measures of the number of health provider visits in the past year, absence of any health provider visits in the past year, absence of any dental visits in the past year, and absence of any preventive well child care visits in the past year. Item nonresponse rates for the independent and dependent variables did not exceed 5%.

### *Statistical Analysis*

We used two methods of analyzing the data to demonstrate the impact of SCHIP. First, we used a pre and post design to assess the impact of SCHIP on access and utilization for the target population of children in families with incomes between 100% and 199% of the FPL. This analysis used 1997 NHIS data as a baseline, which predates the implementation of SCHIP, and 2003, the six-year point of the program, as the endpoint. Second, we used multivariable analyses to assess the impact of SCHIP within the target population during 2003. Specifically, multivariable models were used to compare children with full-year public coverage to those with full-year private coverage, part-year coverage and full-year uninsured while controlling for confounding variables including child's age, gender, race and ethnicity, family structure, family income, region



and place of residence, parental education, health insurance, and parental report of health status. All analyses were conducted using the SUDAAN statistical software. This statistical software program adjusts for the complex sample design of the NHIS in computing standard errors.(23)

## **Results**

### *Changes in Health Insurance Coverage from 1997 to 2003*

Overall, there was a significant reduction in the proportion of U.S. children without insurance between 1997 and 2003 (Table 1). In 1997, prior to the enactment of SCHIP, 8.4% of all children were uninsured for the entire year. By 2003 that proportion had fallen to 5.3% ( $P < .001$ ). Children living in families with incomes between 100% and 199% of the FPL, the SCHIP target income population, showed the largest percentage reduction in rates of uninsurance among all income groups (15.1% to 8.7%;  $P < .001$ ). Children living in families with incomes less than 100% of the FPL also saw gains, with the rate of uninsurance declining from 14.5% to 10.2% between 1997 and 2003 ( $P < .001$ ). A more modest but still significant gain occurred for children in families with incomes at or above 200% of the FPL.

All of the reductions in uninsurance are attributable to growth in public insurance coverage. While children in all three poverty categories gained public coverage, children living in families with incomes between 100% and 199% of the FPL showed the most substantial percentage gains in obtaining full year public coverage, growing from 18.7% to 39.5% between 1997 and 2003 ( $P < .001$ ). Some of these gains in coverage for children were offset by substantial erosion in private coverage. Children living in families with incomes between 100% and 199% of the FPL experienced the largest



percentage decline in private health insurance, from 53.5% to 40.9% between 1997 and 2003 ( $P < .001$ ).

We also assessed the prevalence of part year coverage to determine whether changes in rates of insurance discontinuity occurred between study years, and assessed the impact of partial year coverage on access to health care and utilization of health care services. Partial year coverage includes children with public and/or private coverage who were covered less than the full year prior to the interview date. Children living in families with incomes less than 100% of the FPL experienced a significant decrease in partial year coverage between 1997 and 2003 (13.0% in 1997 to 9.3% in 2003,  $P < .001$ ). Children in the SCHIP target income group of 100% to 199% of the FPL had a higher prevalence of partial year coverage in 2003 than those below 100% of the FPL and showed no significant change over the study period (12.7% in 1997 to 10.9% in 2003). The prevalence of partial year coverage among children living in higher income groups was much lower and showed no significant change over the study period (4.3% in 1997 to 4.7% in 2003).

#### *Changes in Access and Utilization of Services*

Improvements in the measures of access to health care for children on the whole have occurred since the implementation of SCHIP, although the effects are small. As shown in Table 2, between 1997 and 2003 a significant reduction occurred in the proportion of children without a usual source of care in the target income group of 100% to 199% of the FPL (9.4% in 1997 to 7.3% in 2003,  $P < .05$ ). Children living in families with incomes  $<100\%$  of the FPL had a similar decline in the proportion of children without a usual source of care (11.3% in 1997 to 8.9% in 2003,  $P < .05$ ). No significant



changes occurred in the other access measures for children in the SCHIP target income group over the study period.

There were also some small changes in the utilization of health care services for children as a group. There was a significant reduction in the proportion of children overall without a provider visit in the past year, from 10.8% in 1997 to 9.8% in 2003 ( $P < .05$ ), although no significant change occurred in children in the SCHIP target income group over the study period. No significant changes occurred in the utilization measures for children in the SCHIP target income group.

To ensure that the findings described above were not subject to the influence of confounding, we replicated the bivariate analyses using multivariable analysis. The results from the multivariable analyses were consistent with those of the bivariate analyses. Results for the adjusted analyses are available upon request from the corresponding author.

### *The Role of Insurance*

In the SCHIP target income group, we found an absence of substantial improvements in access and utilization for children which may have been attributable to the gains in public coverage being diluted by the losses in private coverage seen in Table 2. Hence, we undertook a closer examination of the effect of public insurance coverage for children in the SCHIP target income group using multivariable analysis. Table 3 presents the results of this analysis for children in families with incomes between 100% and 199% of the FPL in 2003. In a series of logistic and ordinary least squares regression analyses, we compared access and utilization outcomes for children with continuous public coverage (the SCHIP target group) to children with continuous private coverage,



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children with part year private or public coverage, and continuously uninsured children. We controlled for race/ethnicity, age, gender, family composition, family income, region and place of residence, health status, and education level of parent.

Our analysis shows that for virtually all of the access and utilization measures, children with full year public coverage experience at least as good and sometimes better outcomes than children with full year private coverage. In contrast, children in the SCHIP target income group without health insurance during the past year were 5 times more likely to experience an unmet health need, 15 times more likely to experience a delay in seeking health care, and 11 times more likely to lack a usual source of care than children with full year private coverage. Near poor children without health insurance coverage during the past year were also far more likely to have gone without preventive well child care or a dental visit during the year.

Effect sizes for the group of children who were uninsured part of the year were not as strong as those for full year uninsured children, but were nevertheless substantial in many cases. Taken together, these results indicate continuous public insurance coverage is associated with significant and substantial improvements in access and utilization when compared to no coverage or partial year coverage.

### **Discussion and Policy Implications**

A large proportion of previously uninsured children gained health insurance coverage as a result of SCHIP. Children living in families with incomes between 100% to 199% of FPL showed the largest percentage reduction in rates of uninsurance among all income groups. The increase in public coverage among poor children can be

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attributed in part to the outreach efforts under SCHIP which identified increasing numbers of Medicaid eligible children after the enactment of SCHIP.

The pattern of decline in private health insurance coverage presented in our findings is a continuation of a larger secular trend of reduced provision of private insurance for children's health care. Private insurance coverage for children on the whole has declined from a high of 69.8% in 1977 to 48.5% in 2001.(24) Although losses in private coverage began well prior to the implementation of SCHIP, some analysts and policy makers have argued that expanded public insurance has contributed to losses of private coverage for children.(24-26) Regardless, SCHIP has played the important role of preventing further erosion in health insurance coverage averting an even greater number of uninsured children, particularly in working poor families.

Our findings demonstrate that children in the SCHIP target income group without health insurance coverage remain at significant risk. They are much more likely to have an unmet health need, a delay in seeking health care, and to lack a usual source of health care than those with full year public coverage. One of the unique contributions of our analysis is the finding that public coverage is as protective as private coverage if it is available on a continuous basis. In 2003, children with full year public coverage were on a par with those children with full year private coverage in all measures except for the absence of a provider visit. These findings suggest SCHIP may play an important role in narrowing health disparities over time.

The National Center for Health Statistics (NCHS) recently published a study on trends in health insurance coverage examining data from a similar time period as our analysis.(19) Our study examined a greater number of access and utilization outcomes

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measures using multivariable analysis to adjust for confounding, and imputation to account for the high rate of item non-response for family income.

### *Methodological Limitations*

This is a cross sectional study and the estimated effects of SCHIP on children before and after enrollment may be influenced by factors not controlled for in the analysis. These factors could include parental error in recall data, bias due to non-response, and secular trends unrelated to SCHIP that may have affected the outcome measures. In particular, the design of our 1997-2003 comparison – sometimes referred to as an untreated comparison group design with separate pretest and posttest samples – is not as powerful as a design using the same individuals in the pretest and posttest periods. Our design implicitly assumes that no other major changes or “shocks” occurred to the treatment and comparison income groups besides the insurance expansions.

Although the NHIS is designed to be representative of the US civilian population, children who are institutionalized or reside in correctional facilities, hospitals, and long-term care facilities are excluded. Homeless and other transient children without a permanent address are also excluded from the survey. These children are more likely to experience greater difficulties in access to health care and utilization of health care services than children included in the NHIS sample. This may result in our estimates of access difficulties being somewhat understated in both time periods.

### **Conclusion**

SCHIP has been highly successful in reducing the number of uninsured children in the U.S. since its introduction. Implementation of SCHIP is associated with substantial gains in public coverage for children in the target income group. Although some of the

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gains were offset by losses in private coverage, our findings demonstrate that public health insurance is a significant protective factor for children living in the target income group. Importantly, the analytic work we reported here will also provide a template for continued monitoring of health care access and utilization for children in the SCHIP target population. This will provide long term value by providing a baseline for assessing the impact of future changes in public programs and private health insurance.

***Acknowledgements:*** The authors thank Lena Libatique for her assistance in the preparation of this manuscript.





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**Table 1: Children's Insurance Status in 1997 and 2003**

|                             | 1997             |      | 2003              |      |                     |
|-----------------------------|------------------|------|-------------------|------|---------------------|
|                             | %                | SE   | %                 | SE   | diff                |
| <b>All Children</b>         | <b>n =13,579</b> |      | <b>n = 11,900</b> |      |                     |
| % Private full year insured | 66.49            | 0.59 | 62.26             | 0.61 | 4.23 <sup>2</sup>   |
| % Public full year insured  | 17.19            | 0.46 | 25.53             | 0.57 | -8.34 <sup>3</sup>  |
| % Partial year insured      | 7.88             | 0.29 | 6.91              | 0.25 | 0.97 <sup>3</sup>   |
| % Full year uninsured       | 8.44             | 0.31 | 5.30              | 0.28 | 3.14 <sup>3</sup>   |
| <b>Less than 100% FPL</b>   |                  |      |                   |      |                     |
| % Private full year insured | 17.56            | 1.07 | 18.31             | 1.09 | -0.75               |
| % Public full year insured  | 55.02            | 1.37 | 62.14             | 1.32 | -7.12 <sup>3</sup>  |
| % Partial year insured      | 12.98            | 0.78 | 9.34              | 0.68 | 3.64 <sup>3</sup>   |
| % Full year uninsured       | 14.45            | 0.86 | 10.22             | .88  | 4.23 <sup>3</sup>   |
| <b>100-199% FPL</b>         |                  |      |                   |      |                     |
| % Private full year insured | 53.51            | 1.21 | 40.90             | 1.28 | 12.61 <sup>3</sup>  |
| % Public full year insured  | 18.71            | .99  | 39.49             | 1.28 | -20.78 <sup>3</sup> |
| % Partial year insured      | 12.68            | 0.70 | 10.88             | 0.77 | 1.80                |
| % Full year uninsured       | 15.10            | .87  | 8.73              | 0.76 | 6.37 <sup>3</sup>   |
| <b>200% or more FPL</b>     |                  |      |                   |      |                     |
| % Private full year insured | 88.59            | 0.46 | 84.28             | 0.54 | 4.31 <sup>3</sup>   |
| % Public full year insured  | 3.26             | 0.26 | 8.52              | 0.43 | -5.26 <sup>3</sup>  |
| % Partial year insured      | 4.30             | 0.29 | 4.72              | 0.28 | -0.42               |
| % Full year uninsured       | 3.84             | 0.27 | 2.48              | 0.26 | 1.36 <sup>3</sup>   |

Source: Author's tabulation of the National Health Interview Survey

<sup>1</sup>statistically significant at p-value<.05

<sup>2</sup>statistically significant at p-value<.01

<sup>3</sup>statistically significant at p-value<.001

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**Table 2: Children's Access & Utilization by Poverty Status 1997 and 2003**

|                                                  | 1997<br>% | SE   | 2003<br>% | SE   | diff               |
|--------------------------------------------------|-----------|------|-----------|------|--------------------|
| <b>Access</b>                                    |           |      |           |      |                    |
| One or more unmet health needs in past 12 months |           |      |           |      |                    |
| All children                                     | 2.17      | 0.13 | 2.28      | 0.16 | -0.11              |
| <100% FPL                                        | 4.73      | 0.46 | 3.66      | 0.47 | 1.07               |
| 100% to 199% FPL                                 | 2.71      | 0.33 | 3.50      | 0.47 | -0.79              |
| 200% or above FPL                                | 1.06      | 0.13 | 1.39      | 0.16 | -0.33              |
| Delayed in seeking care in past 12 months        |           |      |           |      |                    |
| All children                                     | 3.86      | 0.20 | 3.76      | 0.20 | 0.10               |
| <100% FPL                                        | 5.61      | 0.50 | 4.99      | 0.54 | 0.62               |
| 100% to 199% FPL                                 | 6.33      | 0.53 | 5.45      | 0.56 | 0.88               |
| 200% or above FPL                                | 2.32      | 0.22 | 2.76      | 0.23 | -0.44              |
| No usual source of care                          |           |      |           |      |                    |
| All children                                     | 6.47      | 0.24 | 4.92      | 0.23 | 1.55 <sup>3</sup>  |
| <100% FPL                                        | 11.31     | 0.76 | 8.86      | 0.72 | 2.45 <sup>1</sup>  |
| 100% to 199% FPL                                 | 9.40      | 0.65 | 7.28      | 0.66 | 2.12 <sup>1</sup>  |
| 200% or above FPL                                | 3.68      | 0.26 | 2.78      | 0.23 | 0.90 <sup>2</sup>  |
| <b>Utilization</b>                               |           |      |           |      |                    |
| Interval since last provider visit > 12 months   |           |      |           |      |                    |
| All Children                                     | 10.78     | 0.32 | 9.76      | 0.36 | 1.02 <sup>1</sup>  |
| <100% FPL                                        | 13.85     | 0.91 | 12.02     | 0.90 | 1.83               |
| 100% to 199% FPL                                 | 14.01     | 0.88 | 12.69     | 0.93 | 1.32               |
| 200% or above FPL                                | 8.49      | 0.35 | 8.00      | 0.45 | 0.49               |
| Mean number of provider visits in past 12 months |           |      |           |      |                    |
| All children                                     | 3.59      | 0.03 | 3.58      | 0.04 | 0.01               |
| <100% FPL                                        | 3.51      | 0.08 | 3.61      | 0.10 | -0.10              |
| 100% to 199% FPL                                 | 3.33      | 0.07 | 3.37      | 0.09 | -0.04              |
| 200% or above FPL                                | 3.71      | 0.04 | 3.65      | 0.05 | 0.06               |
| No preventive well child visit in past 12 months |           |      |           |      |                    |
| All children                                     | 26.57     | 0.50 | 27.97     | 0.60 | -1.40              |
| <100% FPL                                        | 28.98     | 1.25 | 33.31     | 1.45 | -4.33 <sup>1</sup> |
| 100% to 199% FPL                                 | 31.80     | 1.19 | 32.57     | 1.28 | -0.77              |
| 200% or above FPL                                | 23.77     | 0.64 | 24.59     | 0.66 | -0.82              |
| No dental visit in past 12 months                |           |      |           |      |                    |
| All children                                     | 27.31     | 0.47 | 28.67     | 0.54 | -1.36              |
| <100% FPL                                        | 37.99     | 1.20 | 37.72     | 1.31 | 0.27               |
| 100% to 199% FPL                                 | 37.51     | 1.11 | 36.90     | 1.32 | 0.61               |
| 200% or above FPL                                | 19.94     | 0.52 | 22.88     | 0.68 | -2.94 <sup>2</sup> |

Source: Author's tabulation of the National Health Interview Survey

<sup>1</sup>statistically significant at p-value<.05<sup>2</sup>statistically significant at p-value<.01<sup>3</sup>statistically significant at p-value<.001



**Table 3: Adjusted Odds Ratios for 2003 Access & Utilization by Insurance Status for Children Living in Families with Incomes between 100% to 199% FPL \***

|                                                  | OR/BC | CI                        |
|--------------------------------------------------|-------|---------------------------|
| <b>Access</b>                                    |       |                           |
| One or more unmet health need in past 12 months  |       |                           |
| Private full year insured                        | 1.00  | (1.00,1.00)               |
| Public full year insured                         | 0.89  | (0.40,1.95)               |
| Partial year uninsured                           | 8.77  | (4.01,19.22) <sup>1</sup> |
| Full year uninsured                              | 5.13  | (2.28,11.52) <sup>1</sup> |
| Delay in seeking care in past 12 months          |       |                           |
| Private full year insured                        | 1.00  | (1.00,1.00)               |
| Public full year insured                         | 1.02  | (0.49,2.14)               |
| Partial year uninsured                           | 14.75 | (7.89,27.58) <sup>1</sup> |
| Full year uninsured                              | 14.62 | (6.92,30.89) <sup>1</sup> |
| Usual source of care                             |       |                           |
| Private full year insured                        | 1.00  | (1.00,1.00)               |
| Public full year insured                         | 0.74  | (0.37,1.47)               |
| Partial year uninsured                           | 4.10  | (2.14,7.85) <sup>1</sup>  |
| Full year uninsured                              | 11.32 | (6.45,19.87) <sup>1</sup> |
| <b>Utilization</b>                               |       |                           |
| Interval since last Dr visit > 12 months         |       |                           |
| Private full year insured                        | 1.00  | (1.00,1.00)               |
| Public full year insured                         | 0.52  | (0.34,0.81) <sup>1</sup>  |
| Partial year uninsured                           | 1.78  | (1.04,3.05) <sup>1</sup>  |
| Full year uninsured                              | 4.12  | (2.49,6.80) <sup>1</sup>  |
| No preventive well child visit in past 12 months |       |                           |
| Private full year insured                        | 1.00  | (1.00,1.00)               |
| Public full year insured                         | 0.63  | (0.46,0.85) <sup>1</sup>  |
| Partial year uninsured                           | 1.41  | (0.95,2.11)               |
| Full year uninsured                              | 3.09  | (1.89,5.05) <sup>1</sup>  |
| No dental visit in past 12 months                |       |                           |
| Private full year insured                        | 1.00  | (1.00,1.00)               |
| Public full year insured                         | 0.69  | (0.52,0.92) <sup>1</sup>  |
| Partial year uninsured                           | 1.53  | (1.00,2.34)               |
| Full year uninsured                              | 4.07  | (2.64,6.29) <sup>1</sup>  |
| Mean provider visits in past 12 months           | Mean  | SE                        |
| Private full year insured                        | 0     | 0                         |
| Public full year insured                         | 1.00  | 0.18                      |
| Partial year uninsured                           | 0.07  | 0.26                      |
| Full year uninsured                              | -0.72 | 0.28                      |

Source: Author's tabulation of the National Health Interview Survey

\* Adjusted for the following: type of insurance, race/ethnicity, age, gender, family composition, family income, region and place of residence, health status, education level of parent and missing income.

OR = odds ratio

BC = beta coefficient

<sup>1</sup>statistically significant at p-value<.05

<sup>2</sup>statistically significant at p-value<.01

<sup>3</sup>statistically significant at p-value<.001



## *Chapter 5*

### *Children's Health Needs and Oral Health Care*



A vertical strip of a book's endpaper, likely from a historical or decorative volume. The strip features a repeating pattern of stylized, gold-embossed letters and symbols. The visible text includes 'U', 'Fr', 'R', and 'NIA' in a decorative, possibly Gothic or similar historical script. The pattern is arranged in a grid-like fashion, with the letters and symbols appearing to be part of a larger, repeating design. The strip is set against a dark background, which appears to be the inner cover or another part of the book's binding.

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## **Children's Health Needs and Oral Health Care**

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1. The first step is to identify the problem. This involves understanding the current situation and what needs to be changed.

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Support: This study was supported by a cooperative agreement from CAN-DO: Center to Address Disparities in Children's Oral Health, sponsored by the National Institute for Dental and Craniofacial Research and the National Center on Minority Health Disparities at the National Institute of Health (U54 DE14251). Additional funding was provided by the Centers for Disease Control and Prevention (CDC/ATPM Cooperative Agreement TS-0842).

Acknowledgements: The authors thank Marilyn Stolar for her statistical assistance in the preparation of this manuscript.

Disclaimer: The views expressed are those of the authors and may not reflect the views of the funding or data collection agencies.



## Children's Health Needs and Oral Health Care

### Abstract

*Background:* Past research has demonstrated that oral health care is the most frequent unmet child health need in the United States. Access to dental care is a serious problem, particularly among poor children. Federal and state initiatives have significantly expanded health insurance for low-income children over the past 20 years through Medicaid eligibility expansions and implementation of the State Children's Health Insurance Program (SCHIP). These programs share the goal of increasing access to care, including dental care, and ultimately improving health status including the oral health of low income, previously uninsured children.

*Objectives:* To determine if the recent expansions in Medicaid and SCHIP have resulted in a narrowing of income disparities over time with the use of dental care in children 2 to 17 years of age.

*Methods:* Seven years of data from the National Health Interview Survey were utilized. A trend analysis was conducted using 1983 as a baseline which predates the expansions, and 2001-02, the endpoint, which postdates implementation of the expansions. In addition, we examined two intermediate time points (1988-89 and 1997-1998). We conducted unadjusted and adjusted analyses using logistic regression.

*Results:* Overall, use of ambulatory dental care has increased dramatically for children over the past two decades. In 1983, more than one in three children (38.5%) had no dental care within the previous 12 months. By 2001-2002, about one quarter of children (26.3%) were reported to have no dental care within the year, a reduction of 12.2

*[Faint, illegible handwriting and markings, possibly bleed-through from the reverse side.]*

percentage points from 1983 ( $P < .001$ ). Frequency of unmet dental care remained unchanged between 1997-98 (the first year this measure is available) and 2001-02. A reduction in income disparities for use of dental care was found in our unadjusted analysis but this difference became statistically insignificant in the adjusted analysis. No changes in income disparities occurred for unmet dental needs in either the unadjusted or adjusted analyses.

*Conclusions:* A substantial overall improvement in dental care use has occurred among all income groups, including poor and near poor children. This “keeping up” with their higher income counterparts represents an important public health accomplishment for children in low income families. Nevertheless, additional efforts are needed to close remaining disparities in access to dental care.

### **Key Words**

Oral health; SCHIP; Medicaid; health disparities; unmet health needs; access



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|----------------------------|-------------------------------|
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| To protect others          | 75                            |
| To protect property        | 65                            |
| To protect the community   | 55                            |
| To protect the environment | 45                            |

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## Introduction

Oral health care ranks as the greatest unmet children's health need in the United States and is much more common than unmet need for medical care.<sup>1</sup> Access to dental care is particularly problematic for poor and near poor children.<sup>2</sup> Specifically, children lower in the socioeconomic hierarchy are more likely to have untreated dental caries, and poor children suffer 12 times the number of restricted activity days caused by dental disease as compared to more affluent children.<sup>3</sup> Similarly, 80% of dental caries occur in 25% of the pediatric population, especially in low-income Latino, American Indian and Alaskan native children—populations that are overrepresented in the lower socioeconomic strata.<sup>4</sup>

Over the past 20 years, federal and state initiatives have significantly expanded health insurance for low-income children through a series of Medicaid eligibility expansions in the 1980s and 1990s and through the enactment of the State Child Health Insurance Program (SCHIP) in 1997. (See Table 2) The goal of these initiatives was increasing access to care, including dental care, and ultimately improving the health status of low income, previously uninsured children. Substantial evidence demonstrated that availability of Medicaid has improved access to care among low-income children,<sup>5,6,7</sup> and early evidence suggests that the SCHIP program is producing similar results.<sup>8</sup> However, the extent to which the Medicaid/SCHIP expansions have improved the *health status* of low-income children has not been well documented. To date, only three studies have been conducted on this question, with inconclusive results.<sup>9,10,11</sup> Two additional studies that examined whether insured and uninsured children experience differential health status reported contradictory results.<sup>12,13,14</sup> Analyses of the 1996

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MEPS on utilization of dental health care services found poor, ethnically diverse children have lower odds of having a yearly dental visit and have less visits per year than non-poor children.<sup>15</sup>

None of the aforementioned studies have conducted a comprehensive evaluation of changes in access and use of dental care before and after the large scale expansions of public insurance coverage for children. There is thus a need for further study to carefully document whether the expansions in public health insurance coverage over the past two decades have contributed to reductions in health disparities in oral health. In addition to providing policymakers with new information on the role of expansions in public insurance, this project will provide a basis for ongoing monitoring of oral health, and health care disparities within the child population.

We hypothesize that the large-scale expansions of publicly-sponsored health insurance coverage during the late 1980s and throughout the 1990s have resulted in improved access and utilization for previously disadvantaged groups of children, particularly children in lower SES families. Specifically, our research question is as follows: Have expansions in Medicaid and SCHIP resulted in a narrowing of income disparities in use of dental care for children? We expected to see reductions in disparities in receipt of dental care by SES and race/ethnicity to narrow over time given the large scale expansions in Medicaid and other public insurance programs for children over the past two decades. We used seven years of the National Health Interview Survey for our analyses. The initial time point for our trend analysis, 1983, predates the expansions and serves as a baseline. The endpoint, 2001-02, postdates implementation

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of the expansions. In addition, we examine two intermediate points (1988-89 and 1997-1998).

## Methods

**Data Source.** The National Health Interview Survey is a nationally representative household survey conducted annually by trained interviewers from the Bureau of the Census for the National Center for Health Statistics.<sup>16</sup> The annual sample includes approximately 40,000 households with about 30,000 children under 18 years old. Brief group interviews are conducted for all household members and more in-depth interviews are conducted for one child and one adult randomly selected in each household. Parents or other adult caretakers respond on behalf of children under 17 years old at the time of the survey. The NHIS includes information on oral health care utilization, including the last time a sample child had a dental care visit and whether a sample child experienced an unmet need for dental services due to cost. Table 1 reports the sample sizes used in the current analysis.

The survey is based on a stratified cluster sample and is designed to be representative of the US civilian population. Children residing in correctional facilities, hospitals, and long-term care facilities were excluded. Homeless and other transient children without a permanent address are also excluded from the survey. In most years, the overall NHIS response rate has exceeded 90%.<sup>16</sup>

We were interested to learn if improvements were achieved in access and utilization of dental health services – specifically whether the disparities narrowed between low income and high-income children – following the expansion of Medicaid and the creation of SCHIP. We classified children into four groups based on their

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family income and family size: below 100% of the federal poverty level (FPL), 100-199% FPL, 200-299% FPL and 300% or above FPL. In 2001, the federal poverty level for a family of four was \$17,650.<sup>17</sup> These groupings were selected because they generally correspond to income eligibility for the Medicaid and SCHIP programs. Our two measures of access and utilization were: the percentage of children who were reported to have an unmet need for dental care in the previous year due to the cost of care and the percentage of children who went without a dental care visit within the previous 12 months.

Our analysis includes seven years of NHIS data collected at four time points: Time 1 (1983), Time 2 (1988-89), Time 3 (1997-98), and Time 4 (2001-02). The first time point, Time 1, predates the health insurance expansions for low-income children. By Time 2 a series of expansions in Medicaid eligibility, targeted primarily at poor children, were underway (see Table 1). At Time 3, SCHIP was implemented for near poor children. The final Medicaid expansions enacted in 1990 continued to be phased-in for poor children during and after Time 3. Time 4, our final data point, reflects the beginning of the post expansion era. The Medicaid expansions were fully phased-in and all states had operating SCHIP programs by this point.

Initially, we planned to use two years of combined data for each time point to improve the precision of our estimates. However, questions related to dental care use and unmet need have not been asked on a uniform basis in the NHIS. Data on receipt of dental care are available for all study years, except for the first time point for which data are only available for the second half of 1983 (and not for 1982). Data on unmet dental needs due to cost were added in a questionnaire revision introduced in 1997. Hence,



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information on unmet dental needs is available for the final two time periods, 1997-98 and 2001-2002 only. (A table displaying the years in which related questions were asked is presented in the appendix.) We restricted our analysis of children to those ages 2 to 17 years given the focus on dental care use and access.

The primary results of our analyses are presented in tabular form. All estimates presented in the text and tables have been statistically weighted to reflect national population estimates. Multivariable analysis was performed to examine whether poverty status (divided into the four categories indicated above) was independently associated with the two outcome variables after controlling for insurance coverage (public, private, none), race/ethnicity (white, black, Hispanic and other), age, gender, family composition, region of residence, respondent perceived health status of the child, and education level of household reference person, as well as missing income cases. Results from these multivariate analyses are summarized here; detailed multivariate analysis results are available from the authors.

Missing item response rates were below 2% for all variables except education and poverty status. Depending on the study year, up to 2% had unreported education and up to 22 % of cases had unreported income data. These missing data may be systematic related to our analysis variables. We address this by including a categorical variable for missing income in our multivariate analyses. Standard errors used in computing test statistics were calculated using variance estimation formulae that account for the complex sample design used in the NHIS.<sup>18</sup>

Finally, we tested our results on dental visits using a trend analysis. The trend test was conducted using piecewise linear regression and is sometimes referred to as the

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“difference in difference” approach. We examined the slopes for each income group stratified by income for each pair of contiguous time points (e.g. Time 1 and Time 2). To test if the slopes for income groups were significantly different from the 300+ income group, we ran interactions between the income groups and time in the combined dataset. This procedure takes into account what would have happened in the previous time period had Medicaid coverage not been expanded during interval 2 or at the third interval had SCHIP not been implemented. A trend analysis was not conducted for unmet dental care needs since this measure was available only for the final two time points.

## **Results**

*Overall Trends in Access and Use of Dental Care.* Use of ambulatory dental care has increased dramatically for children over the past two decades (Figure 1). In 1983, the beginning of our trend analysis, more than one-third of children (38.5%) had no dental care within the previous 12 month. By 2001-02, about one-quarter of children (26.3%) were reported to have no care within the year, a reduction of 12.2 percentage points from 1983 ( $P<.001$ ). Interestingly, there was no statistically significant change in the overall proportion of children with unmet need for dental care due to costs of care since NHIS began collecting those data in 1997-98, with 6 to 7 percent of children being reported with unmet needs in both time periods.

*SES Differences in Receipt of Dental Care.* In the pre-Medicaid expansion period and the pre-SCHIP periods, wide disparities in use existed among children across poverty categories. In 1983, 53.5 % of children with family incomes below the Federal Poverty Level (FPL) were reported to have had no dental care in the previous year

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compared to 21.4 % of children with family incomes at or above 300% of poverty ( $P<.001$ ; Table 2).

As indicated in Table 3, children in the lowest income group had a 2.5 times higher adjusted odds of going without dental care than children in the highest income group during 1983 (OR=2.5; 95% CI=2.00,3.08). In addition, children with incomes between 100% and 199% of poverty had a 2.7 times higher adjusted odds of having no dental visit than high income children in 1983 (OR=2.7; 95%CU=3.04,4.17) After taking into account confounding variables and missing data in the adjusted analysis, these odds ratios attenuated somewhat though they remained significant.

By 2001-02, the disparities in receipt of dental care narrowed as evidenced by the pattern of reductions in the unadjusted odds ratios shown in Table 3. Specifically, the odds of the lowest income children having no dental care compared to the highest income children declined from 4.2 to 3.0 between 1983 and 2001-02 ( $P<.001$ ). However this reduction was not significant after adjusting for confounding. Among children with incomes between 100% and 199% of poverty, the unadjusted odds declined from 3.4 to 2.7 ( $P<.001$ ). Again however, the difference in adjusted odds ratios was insignificant. In the subsequent trends analysis, we found significant trends only for the group below 100% FPL and only between 1988-89 and 1996-97 (where a significant downward trend was found) and between 1996-97 and 2001-02 (where a significant upward trend was found). (Results not shown.) It should be noted that between 1988-89 and 1997-98 two changes occurred in the NHIS which may in part be responsible for any changes observed during this period. First, the wording of the question regarding use of dental services changed slightly (see the appendix) and there was a change in the sampling

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design of the NHIS in 1997. Specifically, the design change included a state level stratification and over-sampling of the Hispanic population.

*SES Differences in Unmet Needs for Dental Care.* Children in the lowest income group were more likely than their higher income counterparts to have an unmet need for dental care due to costs in 1997-98, prior to the implementation of SCHIP. During those years, 9.1 % of children in families with incomes below the poverty level and 11.4% of children in near poor families (100-199% of the FPL) had an unmet need for dental care compared to only 2.2 % of children in families with incomes at or over 300% of poverty ( $P<.001$  for both comparisons) (Table 2). The adjusted odds of poor children having an unmet need was 4.5 (95% CI= 3.67, 5.61) times higher than for children in the highest income group. (Table 3) Similarly, the odds of near poor children having an unmet dental need was 5.9 (95% CI=4.80,7.13) times higher than for children in the highest income category. Hence, at baseline significant SES related disparities existed for unmet dental needs.

We expected to see reductions in SES gradients by the endpoint of our analysis period, 2001-02. At best, however, only suggestive changes occurred. The odds for poor children having an unmet dental need compared to children in the highest income category remained essentially unchanged in both the unadjusted and adjusted models. For near poor children, there was a suggestive but not statistically significant decline in the odds of having an unmet dental need from 5.9 to 4.7 in the unadjusted model and from 4.0 to 3.3 in the adjusted model.



1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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## Discussion

Public coverage of low income children has grown significantly over the past two decades. Since 1985, more than 10 million children have been added to Medicaid and nearly 5 million children have been added to SCHIP.<sup>19</sup> Meanwhile, there have been major overall improvements in children's use of dental care. The proportion of children with no dental care in the past 12 months declined from 38.5% in 1983 to 26.3% in 2001-2002. This overall improvement in dental care use has occurred among all income groups, including poor and near poor children. This represents a major public health accomplishment for children.

Moreover, our findings suggest that disparities in use of dental care may be narrowing over time, at least in absolute terms. The unadjusted odds of going without a dental care visit declined significantly among children with incomes below 200% of poverty. Though the significance of this finding did not persist after adjusting for potentially confounding factors, at a minimum, low-income children were able to “keep pace” with their more affluent counterparts. Considering that a significant improvement in use of dental care occurred for children in the higher income categories, this is an important success story for children in low income families.

More disappointing, we found no improvements in the frequency of unmet needs for dental care needs due to cost overall or among individual income groups. We didn't expect to see a decline among Medicaid eligible children because any impact of the Medicaid expansions on unmet dental needs would have been largely felt by 1997-98, but did expect to observe a decline among SCHIP covered children (children with incomes between 100% and 200% of poverty). While the gradient between lower

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income and highest income children did shift most acutely among the near poor children targeted for SCHIP, the change was modest and not found to be statistically significant. This is somewhat surprising given that dental insurance coverage has grown steadily over the study period. This may be related to small cell size, but it could also be related to an absence of an actual difference. Perhaps as additional years of data for the post SCHIP implementation years become available, this trend may become statistically significant. It's also worth noting that many SCHIP programs do not cover dental services, so a lack of major changes related to SCHIP may not be surprising.

There are some limitations to our study. The National Health Interview Survey is a household survey and hence does not include institutionalized, homeless or transient children. There is also a significant amount of missing income data. While we have attempted to address this by including the missing cases in our analyses, this remains a shortcoming.

## **Conclusion**

Our findings suggest that utilization of dental services has dramatically increased among the child population as a whole and among the low-income children targeted by the expansions in public insurance coverage. While a narrowing -- if not elimination-- of the gaps in utilization between poor and non-poor children is a major goal of extending health insurance to low income children, it may be that “keeping up” with higher income children is the best intermediate outcome.

If we are to eliminate the still present disparities, considerable more work is required if improved access to insurance is to be part of the equation. Chief among the tasks is to increase the pool of dentists willing and able to serve children enrolled in

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public programs. Enrollment in an insurance program does not translate into utilization unless there are providers available to serve the enrollees. Low reimbursement rates, excessive paper work and other factors discourage their participation, and these issues must be addressed. Reducing disparities in utilization of oral health services is also dependent on ensuring that eligible children enroll in existing health insurance programs and maintain that coverage. A 2003 review of the literature concluded that retention of children in Medicaid and SCHIP remains “a big problem” nationwide.<sup>20</sup> While solid figures on the number of eligible children who drop out of these programs is not available, it is widely agreed among program administrators as well as advocates, according to the report, that far too many children leave the programs for various reasons. Increasing the pool of dental providers available to low income children, as well as doing a better job of enrolling and retaining children in existing programs should go far in reducing disparities in utilization of dental services through insurance coverage.

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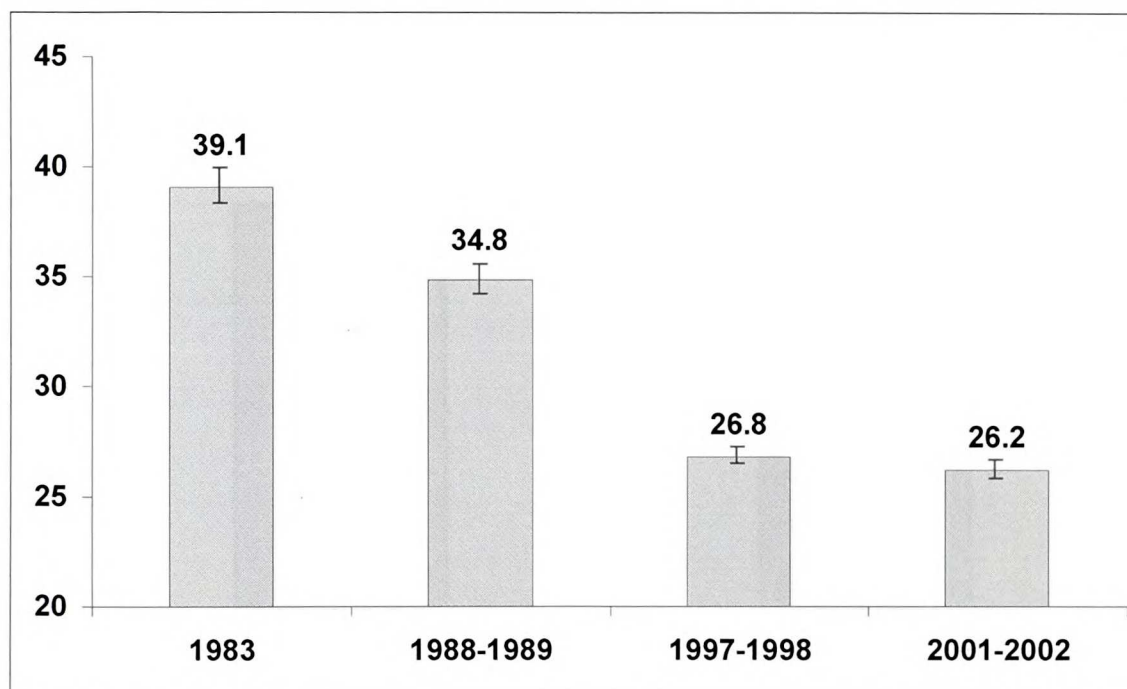
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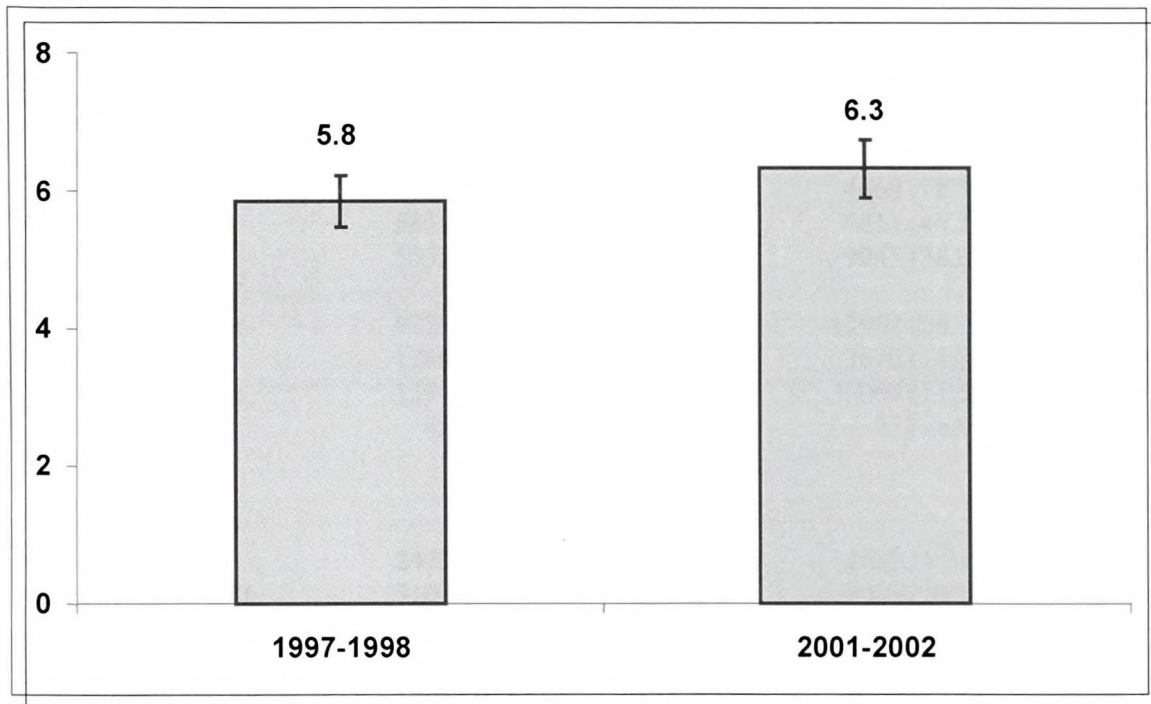
**Figure 1**  
**Percent of Children Receiving No Dental Care in the Past Year**



Source: Authors' tabulations of the National Health Interview Survey

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**Figure 2**  
**Percent of Children with an Unmet Need for Dental Care Due to Cost in the Past Year**



Source: Authors' tabulations of the National Health Interview Survey



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**Table 1**  
**Characteristics of the Study Population Over Time**

|                       | <b>Time 1</b><br><b>N (%)</b> | <b>Time 2</b><br><b>N (%)</b> | <b>Time 3</b><br><b>N (%)</b> | <b>Time 4</b><br><b>N (%)</b> |
|-----------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <b>Total</b>          | 12808                         | 26703                         | 23524                         | 22477                         |
| <b>Age</b>            |                               |                               |                               |                               |
| 0-4                   | 2460 (19.1)                   | 5021 (19.0)                   | 4668 (18.7)                   | 4357 (18.5)                   |
| 5-11                  | 5313 (41.0)                   | 11983 (45.1)                  | 9811 (44.5)                   | 9390 (44.3)                   |
| 12-17                 | 5035 (39.9)                   | 9699 (35.9)                   | 9045 (36.8)                   | 8730 (37.3)                   |
| <b>Race-Ethnicity</b> |                               |                               |                               |                               |
| Non-Hispanic          | 9229 (71.4)                   | 17854 (68.7)                  | 12902 (66.1)                  | 11988 (64.0)                  |
| White                 | 1760 (14.3)                   | 4654 (14.9)                   | 3670 (14.8)                   | 3612 (14.8)                   |
| Non-Hispanic          | 1399 (10.9)                   | 3068 (12.0)                   | 6000 (14.6)                   | 5956 (16.5)                   |
| Black                 | 420 (3.4)                     | 1127 (4.4)                    | 952 (4.6)                     | 921 (4.7)                     |
| Hispanic              |                               |                               |                               |                               |
| Other                 |                               |                               |                               |                               |
| <b>Income</b>         |                               |                               |                               |                               |
| < 100% FPL            | 2473 (19.5)                   | 4876 (17.3)                   | 3695 (15.4)                   | 2844 (12.2)                   |
| 100-199% FPL          | 3104 (24.2)                   | 5806 (21.7)                   | 4329 (18.2)                   | 3905 (16.9)                   |
| 200-299% FPL          | 2759 (21.4)                   | 5659 (21.5)                   | 3680 (16.5)                   | 3335 (15.3)                   |
| 300+                  | 3145 (24.5)                   | 7129 (27.6)                   | 7926 (34.4)                   | 7587 (34.9)                   |
| Missing               | 1327 (10.5)                   | 3233 (11.9)                   | 3894 (15.5)                   | 4806 (20.8)                   |

Source: Authors' tabulations of the National Health Interview Survey

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**Table 2:**  
**Public Insurance Expansions for Children**

| <b>Legislation</b>                                       | <b>Eligibility Expansion</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Omnibus Budget Reconciliation Act of 1986 (OBRA-86)  | OBRA-86 (P.L. 99-509) gave states the option to expand Medicaid income eligibility thresholds above AFDC levels up to the federal poverty level for pregnant women and infants, effective April 1, 1987. It also gave states the option of phasing in coverage for poor children up to age 5, effective October 1, 1990.                                                                                                                                                                                                                                                                                                                                                                                                         |
| The Omnibus Budget Reconciliation Act of 1987 (OBRA-87)  | OBRA-87 (P.L. 100-203) allowed states to raise Medicaid income thresholds for pregnant women and infants as high as 185 percent of the federal poverty level, effective July 1, 1988. It also amended the statute to give states the option of phasing in coverage of poor children up to age 8, effective October 1, 1988.                                                                                                                                                                                                                                                                                                                                                                                                      |
| The Medicare Catastrophic Care Amendments of 1988 (MCCA) | MCCA (P.L. 100-360) mandated minimum coverage of pregnant women and infants at the federal poverty level, with a 2-year phase-in period, effective for calendar quarters beginning on or after July 1, 1989. Affected states were to raise income limits to 75 percent of poverty by July 1, 1989, and to poverty level by July 1, 1990. MCCA also added Section 1902 (r) (2) to the Social Security Act, which allows states to use more liberal criteria for Medicaid than is used for the AFDC program to determine Medicaid financial eligibility, effective July 1, 1988. States can disregard specific amounts of income and other resources and allow certain categories of eligible populations to qualify for Medicaid. |

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**Table 2(cont'd):  
Public Insurance Expansions for Children**

| <b>Legislation</b>                                      | <b>Eligibility Expansion</b>                                                                                                                                                                                                                                                |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Omnibus Budget Reconciliation Act of 1989 (OBRA-89) | OBRA-89 (P.L. 101-239) superseded MCCA's mandate schedule by requiring states to cover, at a minimum, pregnant women and children up to age 6 at 133 percent of the federal poverty level, effective for calendar quarters beginning on or after April 1, 1990.             |
| The Omnibus Budget Reconciliation Act of 1990 (OBRA-90) | OBRA-90 (P.L. 101-508) required states to begin (effective on or after July 1, 1991) to phase in coverage of children born after September 30, 1983, until all children living below poverty up to age 19 are covered; the upper age limit will be reached by October 2002. |
| The Balanced Budget Act of 1997 (BBA-97)                | BBA-97 (P.L. 105-33) provided \$24 billion in federal matching funds over 5 years to help states expand health care coverage to over 5 million of the nation's uninsured children.                                                                                          |

Source: GAO/HEHS-95-175 Medicaid and Uninsured Children and <http://www.cms.hhs.gov/schip/legislation/>

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**Table 3**  
**Disparities in Children's Access to Dental Care by Poverty Status: Percent Differences Over Time**

| <b>Income</b>                                 | <b>T1</b>    | <b>T2</b>    | <b>T3</b>    | <b>T4</b>    | <b>Diff T1-T4</b> | <b>Diff T1-T2</b> | <b>Diff T2-T3</b> | <b>Diff T3-T4</b> |
|-----------------------------------------------|--------------|--------------|--------------|--------------|-------------------|-------------------|-------------------|-------------------|
| <b>Percent no dental care in past year</b>    | <b>%(SE)</b> | <b>%(SE)</b> | <b>%(SE)</b> | <b>%(SE)</b> | <b>%</b>          | <b>%</b>          | <b>%</b>          | <b>%</b>          |
| Total                                         | 39.1(0.83)   | 34.8(0.60)   | 26.8(0.36)   | 26.2(0.42)   | 12.9***           | 4.3***            | 8.0***            | 0.6               |
| <100%                                         | 53.5(1.43)   | 52.1(1.38)   | 37.2(0.90)   | 38.3(1.19)   | 15.2***           | 1.4               | 14.9***           | -1.10             |
| 100-199%                                      | 49.3(1.36)   | 44.2(1.15)   | 38.5(0.89)   | 35.2(1.00)   | 14.1***           | 5.1               | 5.7***            | 3.30              |
| 200-299%                                      | 32.2(1.22)   | 29.9(0.89)   | 27.4(0.83)   | 28.5(0.90)   | 4.7***            | 2.2               | 2.6               | -0.10             |
| 300%+                                         | 21.4(1.01)   | 19.2(0.54)   | 16.6(0.48)   | 16.9(0.49)   | 4.8***            | 2.2               | 2.6***            | -0.30             |
| <b>Unmet need for dental care due to cost</b> |              |              |              |              |                   |                   |                   |                   |
| Total                                         |              |              | 5.8(0.19)    | 6.3(0.22)    |                   |                   |                   | -0.43             |
| <100%                                         |              |              | 9.1(0.62)    | 11.3(0.83)   |                   |                   |                   | -2.20*            |
| 100-199%                                      |              |              | 11.4(0.61)   | 11.1(0.65)   |                   |                   |                   | 0.30              |
| 200-299%                                      |              |              | 6.0(0.45)    | 8.1(0.56)    |                   |                   |                   | -2.10***          |
| 300%+                                         |              |              | 2.2(0.17)    | 2.6(0.22)    |                   |                   |                   | -0.40**           |

Source: Authors' tabulations of the National Health Interview Survey

\*\*\* Statistically significant at p-value< 0.05

\*\* Statistically significant at p-value< 0.01

\* Statistically significant at p-value <0.001



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**Table 4**  
**Disparities in Children's Access to Dental Care by Poverty Status: Unadjusted and Adjusted Odds Ratios**

| Income                                        | Time 1             | CI          | Time 2             | CI          | Time 3 | CI            | Time 4 | CI           |
|-----------------------------------------------|--------------------|-------------|--------------------|-------------|--------|---------------|--------|--------------|
| <b>Unadjusted OR</b>                          |                    |             |                    |             |        |               |        |              |
| <b>No Dental Care in the Past Year</b>        |                    |             |                    |             |        |               |        |              |
| <100% FPL                                     | 4.2 <sup>a,b</sup> | (3.61,4.90) | 4.6 <sup>a,b</sup> | (4.05,5.19) | 3.0    | (2.70,3.31)   | 3.0    | (2.72,3.43)  |
| 100-199% FPL                                  | 3.4 <sup>a,b</sup> | (3.04,4.17) | 3.3 <sup>a,b</sup> | (3.00,3.74) | 3.1    | (2.85,3.49)   | 2.7    | (2.30,2.98)  |
| 200-299% FPL                                  | 1.7                | 1.52,2.00)  | 1.8                | (1.62,2.00) | 1.9    | (1.70,2.13)   | 2.0    | (1.77,2.17)  |
| 300%+ FPL                                     | 1.0                |             | 1.0                |             | 1.0    |               | 1.0    |              |
| <b>Unmet Need for Dental Care Due to Cost</b> |                    |             |                    |             |        |               |        |              |
| <100% FPL                                     |                    |             |                    |             | 4.5    | (3.67,5.61)   | 4.8    | (3.79,6.00)  |
| 100-199% FPL                                  |                    |             |                    |             | 5.9    | (4.80,7.13)   | 4.7    | (3.81,5.74)  |
| 200-299% FPL                                  |                    |             |                    |             | 2.9    | (2.30,3.61)   | 3.3    | (2.61,4.16)  |
| 300%+ FPL                                     |                    |             |                    |             | 1.00   |               | 1.00   | 2.23         |
| <b>Adjusted OR*</b>                           |                    |             |                    |             |        |               |        |              |
| <b>No Dental Care in the Past Year</b>        |                    |             |                    |             |        |               |        |              |
| <100% FPL                                     | 2.5                | (2.00,3.08) | 2.49               | (2.13,2.92) | 1.8    | (1.52,2.07)   | 1.8    | (1.52,,2.10) |
| 100-199% FPL                                  | 2.7                | (2.21,3.20) | 2.37               | (2.10,2.69) | 2.2    | (1.94,2.48)   | 1.8    | (1.55,2.05)  |
| 200-299% FPL                                  | 1.5                | (1.27,1.72) | 1.50               | (1.34,1.68) | 1.6    | (1.45,1.842)  | 1.7    | (1.47,1.87)  |
| 300%+ FPL                                     | 1.0                |             | 1.00               |             | 1.00   |               | 1.00   |              |
| <b>Unmet Need for Dental Care Due to Cost</b> |                    |             |                    |             |        |               |        |              |
| <100% FPL                                     |                    |             |                    |             | 3.2    | (2.40,4.23)   | 3.3    | (2.40,4.49)  |
| 100-199% FPL                                  |                    |             |                    |             | 4.0    | (3.154,5.028) | 3.3    | (2.54,4.23)  |
| 200-299% FPL                                  |                    |             |                    |             | 2.4    | (1.91,3.012)  | 2.7    | (2.07,3.40)  |
| 300%+ FPL                                     |                    |             |                    |             | 1.00   |               | 1.00   |              |

Source: Authors' tabulations of the National Health Interview Survey

\* Adjusted for the following: type of insurance, race/ethnicity, age, gender, family composition, region of residence, health status, education level of parent and missing income.

a: statistically significant from Time 2 at p-value<.05

b: statistically significant from Time 3 at p-value<.05

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**Appendix**  
**NHIS Questions 1983-2001**

|                                                                                                                                                                            | 1983 | 1988 | 1989 | 1997 | 1998 | 2001 | 2002 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|
| About how long has it been since...LAST went to a dentist?                                                                                                                 | √    | √    | √    |      |      | √    | √    |
| About how long has it been since [S.C. name] last saw or talked to a dentist?                                                                                              |      |      |      | √    | √    |      |      |
| During the past 12 months, was there any time when .... needed any of the following but didn't get it because you couldn't afford it: dental care (including check-ups)?'' |      |      |      | √    | √    | √    | √    |

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*Chapter 6*

*SCHIP: A Predictor for the Future of Publicly Funded Health*

*Insurance Programs for Children*

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The enactment of the State Children's Health Insurance Program (SCHIP) in 1997 represents the largest single expansion of health insurance coverage for children living in low-income families in 30 years. There were 11 million uninsured children in the U. S. at the time that SCHIP was enacted, 15% of the pediatric population, and there was consensus among policy makers nationally that legislation was needed to reduce the number of uninsured children (Feder, Uccello, & O'Brien, 1999).

The SCHIP legislation was motivated by the belief that expanding health insurance coverage increases utilization of preventive health care services and improves the health of low-income children (Kaestner, Joyce, & Racine, 2001). SCHIP provided an attractive program design to states and flexibility in premiums and benefits. However, the legislation did not suggest any goals for health outcomes in the target SCHIP population. This gap in the legislation leaves significant challenges for researchers in measuring the success of the program in meeting the health needs of children living in low-income families.

### **The Impact of SCHIP**

To date, there had been relatively few national studies examining the health outcomes of children in the target income group. The study presented in this dissertation on the impact of public insurance expansions, particularly SCHIP, on children's access and use of health care services begins to fill the gap in the literature and provide further evidence of the importance of providing public health insurance to children living in low-income families.

The results of the study indicate that SCHIP has lead to substantial gains in insurance coverage for children living in families with incomes between 100% and 199%



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of the FPL-- the target income group. The proportion of children in the target income group who were uninsured for the full year declined by nearly half between 1997 and 2003. There was also a significant reduction in the proportion of children without a provider visit in the past year. Some of the gains in public coverage were offset by losses in private coverage, but this was a trend that was well under way prior to the enactment of SCHIP. The establishment of SCHIP ameliorated increases in the rate of uninsurance during the study period.

Measures of usual source of care and the proportion of children without a provider visit in the past year also showed significant improvement during the study period. Other measures included in the study such as receipt of preventive well child visits showed no significant changes over the study period. This finding is consistent with the fact that funding through the Early Periodic Screening and Development Testing (EPSDT) program which was in place prior to 1990 has continued to provide payment for access to well care and immunizations for uninsured children living in low-income families.

The measure of one or more unmet health needs also showed no significant improvement in the study. This finding was more surprising considering the significant reduction in numbers of uninsured children during the study period. It is probable that as more children had access to care, the number of health care needs identified increased and parents were faced with further barriers in obtaining specialty care or care for children with special health care needs who enrolled in unexpected numbers in SCHIP programs across states.

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Overall, this study demonstrated that SCHIP has been successful to date in improving access to care for large numbers of uninsured children living in low-income families. The study results provide further evidence that expansions of public health insurance have improved the health and health outcomes of America's children, and that the expansions represent an important public health accomplishment for children living in low-income families.

### **The Impact of Public Health Insurance Expansions on Oral Health in Children**

Over the past 20 years, federal and state initiatives have significantly expanded dental health insurance for low-income children through a series of Medicaid eligibility expansions in the 1980s and 1990s and through the enactment of the SCHIP in 1997. Oral health care ranks as the greatest unmet children's health need in the U. S., and access to dental care is particularly problematic for poor and near poor children (Lewis, Grossman, Domoto, & Deyo, 2000; Newacheck, Hughes, Hung, Wong, & Stoddard, 2000).

The study presented in this dissertation examines the impact of Medicaid expansions and SCHIP on the use of dental care in children from 2 to 17 years of age. The study period presents findings over time beginning in 1983 and using 2002 as the endpoint. The results indicate that there has been a dramatic increase in the use of ambulatory dental care for children living in low-income families. The increase continued until 1997 when the findings revealed a plateau of numbers of children with a dental visit in the past year. This finding is consistent with the results in the SCHIP study showing there was no improvement in the receipt of preventive dental visits between 1997 and 2003.

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This finding was somewhat surprising given that dental insurance coverage has grown steadily over the study period. There are significantly more barriers for seeking preventive dental care for children living in low-income families than for seeking preventive health care services and well child care services. Perhaps as additional years of data for the post SCHIP implementation years become available and there is an increase in dental providers willing to care for children, this trend may become statistically significant. Also, some SCHIP programs across states do not cover dental services, so a lack of major changes related to SCHIP may not be surprising.

Overall, this study demonstrated the importance of public health insurance expansions on improving access to dental health care for large numbers of uninsured and underinsured children living in low-income families. A substantial overall improvement in dental care occurred among poor and near poor children. This improvement occurred despite the substantial improvements in oral health care among children living in higher income families during the study period. This “keeping up” with their higher income counterparts represents an important public health accomplishment for children in low income families. Nevertheless, additional efforts are needed to close remaining disparities in access to dental care, and further research is needed on the impact of SCHIP on oral health care as more NHIS data becomes available.

### **Limitations of NHIS**

This dissertation used NHIS data from a wide range of years to examine the impact of public insurance expansions on access to health care for children. Researchers using the NHIS engaged in health services research in children are faced with inherent



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limitations in the database. Limitations were acknowledged in the discussion sections of the studies.

Although the NHIS is designed to be representative of the US civilian population, children who are institutionalized or reside in correctional facilities, hospitals, and long-term care facilities are excluded from the sample. Homeless and other transient children without a permanent address are also excluded from the survey. These children are more likely to experience greater difficulties in access to health care and utilization of health care services than children included in the NHIS sample. This may result in estimates of access difficulties being somewhat understated during the study periods.

Missing income data is a problem in all household surveys. To address this issue, NCHS has developed a set of data files with imputed values for cases with missing income data. These files were used in the analyses in both studies. Inherent limitations remain with imputed values for missing cases.

The SCHIP study is a cross sectional study and the estimated effects of SCHIP on children before and after enrollment may be influenced by factors not controlled for in the analysis but inherent in the database. These factors could include parental error in recall data, bias due to non-response, and secular trends unrelated to SCHIP that may have affected the outcome measures. In particular, the design of the 1997-2003 comparison study – sometimes referred to as an untreated comparison group design with separate pretest and posttest samples – is not as powerful as a design using the same individuals in the pretest and posttest periods. This limitation may explain the improved results of the state level studies presented in the literature review which were conducted using SCHIP enrollee data on families over time. The untreated comparison group



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design implicitly assumes that no other major changes or “shocks” occurred to the treatment and comparison income groups besides the insurance expansions.

This dissertation used NHIS data from a wide range of years to examine the impact of public insurance expansions on access to health care for children. The NHIS was redesigned in 1997 and made data retrieval and analysis more challenging, particularly for the study on the impact of public insurance expansions on children’s oral health, due to substantial changes in core files over time, the addition of supplements to the core questionnaires, and the questionnaire redesign. For the study on the impact of public insurance expansions on children’s access to oral health care, the 1983 NHIS data were used as the baseline for the trend analysis and 2001-02 as the endpoint. This trend analysis included two intermediate time points-1988-89 and 1997-98, therefore, results of this study could be impacted by the NHIS redesign.

## **Discussion**

The goal of public insurance expansions was increasing access to care, including oral health care, and ultimately improving the health status of low income, previously uninsured children. Substantial evidence demonstrates that availability of Medicaid expansions and SCHIP have improved access to care among low-income children and use of health care services. However, the extent to which the public insurance expansions have improved the *health status* of low-income children has not been established. State-level and national studies presented that examine whether uninsured and underinsured children have experienced improved health status as a result of public insurance expansions have reported contradictory results.

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There is thus a need for further study to carefully document whether the expansions in public health insurance coverage over the past two decades have contributed to reductions in health disparities in children living in low-income families. In addition, researchers and policymakers need further evidence of the role of public insurance in reducing health care disparities within the child population.

## **Conclusion**

Access to health care for children living in low-income families in the United States continues to confront policy makers at the state and federal level. The incremental approach in the U. S. to providing health care for children living in low-income families who are uninsured and underinsured has proven problematic in meeting the needs of the population of poor and near poor children.

SCHIP has a potential role in narrowing disparities among racial and ethnic groups who are continually enrolled in the program, however, program outcomes must be monitored to assure equal access to care, and use of health care services among groups to make certain disparities are not perpetuated.

The basic question of access research “To what extent do health care services contribute to children’s health?” remains an important question. Public health insurance programs such as Medicaid and SCHIP provide an increasing percentage of medical care to children in the U. S. and represent significant expenditures in time and finances for policy makers. The studies presented in this dissertation highlight the importance of access to care and use of health care services for children and the important contribution of public health insurance in providing access. The results inform policy and further

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public health insurance programs and their role in protecting the health of the next generations of Americans.

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