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The impact of parental health coverage on insured children's utilization of health care services

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THE IMPACT OF PARENTAL HEALTH COVERAGE ON INSURED CHILDREN'S UTILIZATION OF HEALTH CARE SERVICES

by

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An Abstract

Of a thesis submitted in partial fulfillment of the requirements
for the Doctor of Philosophy degree in Pharmacy
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Thesis Supervisor: Associate Professor Julie M. Urmie

Over six million insured children belong to families where the parents in their household lack health insurance. Studies have indicated insured low-income children with uninsured parents are less likely to have physician visits and well-child visits than their counterparts with insured parents. However, self-selection may be responsible for the relationship found between parental insurance and well-child visits. No studies have been undertaken to examine the impact of parental insurance on the utilization of children with chronic conditions. Social Cognitive Theory was used to model children's health care utilization and explain the relationship between parental insurance and that utilization. The objectives of the study are to estimate the effect of health insurance for the primary parent on (1) insured children's well-child visits and (2) physician visits for asthma in insured children.

This study used a cross-sectional design. The data source was the 2007 Medical Expenditure Panel Survey-Household Component. The sample consisted of children 17 years or less who were insured through the same source(s) for the entire year and had a primary parent who was either insured or uninsured the entire year. The dependent variable for the entire sample was whether or not the child had at least one well-child visit during the year. The dependent variables for the subsample of children with asthma were (1) whether or not the child had at least one asthma-related physician visit and (2) whether or not the child had at least two asthma-related physician visits. The independent variables were the same for the three analyses and were selected to represent the Social Cognitive Theory determinants. These included parent (insurance, sex, worry, education, language, employment, health use, health, risk aversion, and self care expectation), child (source of coverage, age, health, race, and oldest child), and

household (Metropolitan Statistical Area, region, number of children, number of parents, and income) variables. Probit and bivariate probit models were estimated for each dependent variable.

The percentage of children with insured parents that had a well-child visit during the year was significantly higher than the percentage of children with uninsured parents that had a well-child visit (50.6% vs. 42.8%, respectively). However, multivariate analyses revealed no significant relationship between parental insurance and well-child visits. The percentages of children with insured and uninsured parents that had an asthma-related physician visit were 29.6% and 32.6%, respectively. The percentages that had at least two asthma-related visits were 14.9% and 14.6%, respectively. No significant relationship was found between parental insurance and asthma-related physician visits. The region of the United States where the child lived and whether the child's parent was employed were associated with each type of utilization. Other determinants were also associated with children's utilization, but these varied with the type of utilization. In conclusion, insured children with insured parents are no more likely to have a well-child or asthma-related physician visit during the year than insured children with uninsured parents.

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CERTIFICATE OF APPROVAL

PH.D. THESIS

This is to certify that the Ph. D. thesis of

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has been approved by the Examining Committee for the thesis requirement for the Doctor of Philosophy degree in Pharmacy at the December 2011 graduation.

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To Joe, who makes every day better

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that only you can do. You have sacrificed so much for me and been so patient through this long process, and I cannot imagine a person more deserving of my sincere appreciation.

ABSTRACT

Over six million insured children belong to families where the parents in their household lack health insurance. Studies have indicated insured low-income children with uninsured parents are less likely to have physician visits and well-child visits than their counterparts with insured parents. However, self-selection may be responsible for the relationship found between parental insurance and well-child visits. No studies have been undertaken to examine the impact of parental insurance on the utilization of children with chronic conditions. Social Cognitive Theory was used to model children's health care utilization and explain the relationship between parental insurance and that utilization. The objectives of the study are to estimate the effect of health insurance for the primary parent on (1) insured children's well-child visits and (2) physician visits for asthma in insured children.

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expectation), child (source of coverage, age, health, race, and oldest child), and household (Metropolitan Statistical Area, region, number of children, number of parents, and income) variables. Probit and bivariate probit models were estimated for each dependent variable.

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CHAPTER I

INTRODUCTION

The vast majority of children in the United States had health insurance in 2008 (Kaiser Commission on Medicaid and the Uninsured 2009a). The purpose of insuring children is to promote their health by ensuring their access to and utilization of health care services. Numerous studies have demonstrated the benefits of health insurance on children in terms of access to and utilization of care (Newacheck et al 1998, Overpeck and Kotch 1995, Stoddard et al 1994). The majority of children had private coverage in 2008; approximately 54% had coverage through an employer-sponsored plan, and four percent had coverage through an individual policy (Kaiser Commission on Medicaid and the Uninsured 2009a). Public insurance programs such as Medicaid and CHIP were created and have been expanded to ensure lower-income children, who might not have access to private health insurance, have access to and utilize care (Hakim et al 2000). Thirty-one percent of children were enrolled in a public insurance program in 2008, leaving only ten percent of children uninsured (Kaiser Commission on Medicaid and the Uninsured 2009a).

The majority (83.2%) of insured children ages 2-17 years who live with at least one parent (which is the majority of children) belong to families where the parents in their household are insured (either both parents in two-parent family or single parent covered) (DeVoe et al 2009). However, over six million insured children belong to families where the parents in their household lack health insurance (either both parents in two-parent family or single parent uninsured) (DeVoe et al 2009). If the parents are uninsured, this means the parent who is primarily responsible for the child's health care,

henceforth referred to as the primary parent, is uninsured. There are studies indicating insured children with an uninsured primary parent are more likely to have unmet medical needs than their counterparts with an insured primary parent (DeVoe et al 2009, DeVoe et al 2008). Studies have also indicated insured children below 200% of the Federal Poverty Level with uninsured parents are less likely to have well-child visits and physician visits (Davidoff et al 2003, Gifford et al 2005). These findings suggest the differences in the rates of care for these children are attributable to their parents being insured or not. However, the failure of these studies to account for certain confounding variables could be leading to erroneous conclusions about parental insurance. The objective of this study is to estimate the impact of health insurance for the primary parent on the use of health services by insured children while controlling for confounding variables.

There are several reasons why we see families with insured children but uninsured parents. While some reasons are not specific to source of coverage, such as the belief coverage for the parent is unnecessary, others are specific to whether coverage is obtained through a public or private source. A child is unlikely to have an uninsured parent if the family has access to private coverage. Among low-income children (<200% of the FPL) with private health insurance, approximately 95% had a parent who was also privately insured (Davidoff et al 2003, Guendelman and Pearl 2004). Only four to five percent had a parent who was uninsured. Expanding the focus to privately insured children of all incomes, only two percent had a primary parent who was uninsured (Hanson 1998). If a child with private insurance does have an uninsured primary parent, there are several possible explanations. Insurance coverage for that parent may be

unaffordable for the family. Family coverage through an employer is generally more expensive than employee-plus-one coverage. The average amount employees paid toward their family health insurance premiums in 2009 was $3,474, compared to $2,363 for employee-plus-one coverage (Branscome 2010). An employed parent unable to afford family coverage from his employer may choose to purchase coverage only for himself and his child, leaving his spouse uninsured. Families purchasing a policy on the individual market may find the inclusion of a parent with a pre-existing condition on the policy makes the policy too expensive and choose to leave that parent off the coverage. Children of divorced parents may get coverage through one parent while their other parent remains uninsured. Families purchasing a policy on the individual market may find one parent is uninsurable due to a pre-existing condition.

Children insured through a public program are more likely to have uninsured parents than privately insured children because parents are less likely than their children to be eligible for public programs. Medicaid is a program jointly funded by the federal and state governments that covers hospital stays, office visits, and preventive care (Kaiser Commission on Medicaid and the Uninsured 2001). Lower-income children, pregnant women, parents, elderly, and disabled individuals are eligible. Children are eligible for Medicaid if their family income falls below eligibility thresholds. States are required to cover children up to certain incomes depending on age. Children 0-5 years up to 133% of the Federal Poverty Level and children 6-18 years up to 100% of the FPL must be eligible (CMS 2005). Many states offer coverage to children in families with incomes above these levels (Ross et al 2009). The number of children with coverage through Medicaid in June 2008 was 22.7 million (Ellis et al 2009). Parents are eligible for

Medicaid in all 50 states, but the income thresholds are generally much lower than for children (Kaiser Commission on Medicaid and the Uninsured 2007a). The median income threshold for entry into Medicaid or CHIP for children was 235% of the FPL in December 2009, whereas the median thresholds for working and unemployed parents were 64% and 38% of the FPL, respectively (Ross et al 2009). The majority of uninsured parents are not eligible for Medicaid (Kaiser Commission on Medicaid and the Uninsured 2007a). Among children with public insurance, less than 60% had a parent who was also enrolled in public insurance (Sommers 2006b). Limiting to publicly insured children in families earning less than 200% of the FPL (low-income), 35% had a primary parent who was uninsured (Davidoff et al 2003).

CHIP is also jointly funded by the state and federal governments. CHIP plans must meet a benchmark of coverage (Kaiser Commission on Medicaid and the Uninsured 2007b). CHIP is intended to provide coverage for lower-income children in families with incomes too high to qualify for Medicaid. If a child applies for CHIP and is found to be eligible for Medicaid, the child must be enrolled in Medicaid rather than CHIP (Kaiser Commission on Medicaid and the Uninsured 2007b). The number of children with coverage through CHIP in June 2008 was 4.8 million (Smith et al 2009). Parents are eligible if the state has obtained a waiver from HHS, but only seven states have waivers to enroll parents in CHIP (Baumrucker 2008, Parisi 2009).

Ineligibility is not the only reason parents do not enroll in public programs with their children. Some eligible parents may not be enrolled because they are not aware they are eligible, they feel the barriers to enrollment are too great, or they do not want the stigma associated with public assistance. Whatever reasons keep parents from getting

coverage, they appear to be greater in publicly insured families than privately insured families.

One concern with excluding parents from public coverage is that it may be detrimental to their uninsured children. Studies have demonstrated lower enrollment in public coverage among eligible children when their parents are not eligible (Ku and Broaddus 2000, Lambrew 2001, Aizer and Grogger 2003, Dubay and Kenney 2003). It is not as worthwhile for the parent to endure the challenges of the enrollment process when only the child is eligible as compared to when the parent and child are eligible (Ku and Broaddus 2000). As previously discussed, uninsured children have less access to and use fewer health care services than insured children. This explains how failure to cover parents translates into a disadvantage for uninsured children but does not speak to any effect on insured children.

Lack of parental coverage may also be detrimental to insured children by reducing the effect of their coverage on access to and utilization of health care services. Social cognitive theory (SCT) provides an explanation for why parental insurance may affect children's utilization. Under SCT, children's utilization is predicted by several determinants. One of these determinants is having the knowledge and skills to use care. If the parent is unable to identify when a child needs care, select a provider, and arrange an appointment, the child will not use care. Another predictor of behavior is confidence in ability to use care. A parent with low confidence in her ability to determine when care is needed, select a provider, and arrange an appointment is less likely to seek care for her child. Also determining a child's use are the outcomes the parent expects from that use and how much the parent values those outcomes. When the parent expects negative

outcomes, the child is less likely to receive care. When the parent expects positive outcomes but derives little value from those outcomes, the child is less likely to receive care. Another determinant of a child's use of care is barriers to that care. Parental insurance is proposed as an intervention that alters children's utilization by influencing these determinants. Among families whose spending on a child's care is limited due to spending on health care for an uninsured parent, parental insurance reduces the cost of care for the previously uninsured parent, increasing available income that could potentially be used for the child's care. Parental insurance can also influence these determinants indirectly by increasing parents' utilization after becoming insured. More experience with providers allows parents to increase their skills and knowledge, bolster their confidence, and increase their expectations and valuations of outcomes. For a parent whose poor health due to lack of health care prohibits her from taking her child for care, increased utilization may improve her health enough to take her child for care. This explains why parental insurance may affect children's health care utilization.

Ten studies have examined the relationship between parental coverage and children's access and utilization (DeVoe et al 2009, DeVoe et al 2008, Davidoff et al 2003, Gifford et al 2005, Guendelman and Pearl 2004, Hanson 1998, Devoe et al 2007, Guendelman et al 2006, Mistry et al 2005, Zimmerman 2005, Yocom 2011). The health care services examined in these studies include physician visits, physician visits specifically for well-child care, emergency room visits, hospital admissions, dental care, and prescription medications. The majority of studies examining physician visits did not find a relationship with parental insurance (DeVoe et al 2009, DeVoe et al 2008, Davidoff et al 2003, Guendelman and Pearl 2004, Hanson 1998, Devoe et al 2007,

Guendelman et al 2006, Zimmerman 2005, Yocom 2011). A relationship was found between parental coverage and well-child visits in the two studies that examined this service, though the relationship in one study was weak and both studies were limited to low-income children (Davidoff et al 2003, Gifford et al 2005). No relationship has been found between parental coverage and children's emergency room visits, hospital admissions, or prescription medications (DeVoe et al 2008, Guendelman and Pearl 2004, Guendelman et al 2006, Mistry et al 2005, Zimmerman 2005, Yocom 2011). Four studies have examined unmet medical need, with only two of the four finding a relationship with parental coverage (DeVoe et al 2009, DeVoe et al 2008, Guendelman and Pearl 2004, Guendelman et al 2006).

Lacking are examinations of the impact of parental insurance on some of these services in certain groups of children such as those of higher incomes. There are no assessments of whether parental insurance influences the care received by children with chronic conditions. This knowledge gap is critical to fill because it relates directly to current and future policies. Policymakers and parents have chosen to provide children with health insurance to ensure they have access to and utilize health care. However, current policies may not be achieving this goal. Access and utilization for insured children may be limited due to their parents' lack of health insurance. It is important to determine if there are differences in access to and utilization of health care services between insured children with insured and uninsured parents, and if there are, if those differences are attributable to parental coverage.

If parental coverage increases insured children's access to and utilization of guideline-recommended care, policymakers can consider revising policies that exclude

parents from coverage. Medicaid expansions under health care reform legislation will achieve coverage of additional parents with incomes up to 133% of the FPL, but this will still leave children with uninsured parents. States can consider increasing their Medicaid eligibility levels for parents beyond those required in the Patient Protection and Affordable Care Act. Such expansions would benefit parents, eligible but unenrolled children, and children who are already insured. Under CHIPRA, no more CHIP waivers for parental coverage will be granted, so this is no longer an option for covering more parents (Parisi 2009).

If parental coverage does not increase insured children's access or utilization, there are two implications. The first relates to future expansions. A benefit to insured children could not be the basis for expanding Medicaid to more parents. Future expansions would have to be based on their benefits to parents and eligible but uninsured children. The second implication relates to current policies. It is unlikely any states expanded Medicaid for parents or obtained waivers to enroll parents in CHIP solely to benefit already enrolled children. Their main purpose was to enroll eligible but uninsured children (Bartels and Boroniec 1998). Nonetheless, benefits to insured children may have provided additional support for policies. If parental coverage does not affect insured children's access or utilization, states would have to determine whether the benefits to parents and children enrolled as a result of the expansion were sufficient to justify the expense of insuring parents. The amount spent per adult in Medicaid in 2007 was $2500 (Kaiser Commission on Medicaid and the Uninsured 2010). If the benefits do not justify the expense, the money spent on insuring parents could instead be used to

bolster enrollment another way, such as expanding outreach efforts, or implement policies that would increase access and utilization among those already insured.

The current literature has not yielded a strong theoretical explanation for why children may or may not utilize health care services. Only one study has applied social cognitive theory to primary care services for children, and only pieces of the theory were examined (Janicke and Finney 2003). Of the ten studies investigating parental insurance, five failed to identify a model for children's utilization, and the remainder used the Aday and Andersen behavioral model of health services use. The authors fail to agree on whether parental insurance is an enabling or predisposing factor in the Aday and Andersen model (Davidoff et al 2003, Hanson 1998). While the Aday and Andersen model proposes factors which may influence health care utilization, it does not indicate which factors are expected to increase utilization and which are expected to decrease utilization (Tanner et al 1983). Social cognitive theory is a more robust model because it specifies how a given factor should influence utilization.

This study examines children who are insured for the entire year and have parents who are insured or uninsured for the entire year in which health care services are measured and allows those children to be any age or have any source of coverage. It looks at visits for preventive care and care for a chronic condition. The study expands examination of the impact of parental insurance on well-child visits, a type of preventive care, to all children. It is the first study to examine the impact of parental insurance on care for a chronic condition, asthma. In addition to its contributions to policy, this study will provide information on whether social cognitive theory can be applied to children's

health care services and offer a stronger theoretical explanation for a relationship between parental insurance and children's utilization of services.

Research Objectives

Objective 1: Estimate the effect of health insurance for the primary parent on insured children's well-child visits.

Objective 2: Estimate the effect of health insurance for the primary parent on physician visits for asthma in insured children.

CHAPTER II

LITERATURE REVIEW

Some evidence exists to suggest insured children whose primary parents are uninsured do not get as much benefit from their health coverage as insured children whose primary parents are insured, but it is unclear whether this relationship is real and if lack of parental health insurance causes children to use less health care. This is concerning given there are more than six million children in the United States who are insured but have uninsured primary parents. In order to fill this gap, this study will examine the impact of health insurance for the primary parent on insured children's utilization of well-child visits and physician visits for asthma. I have selected social cognitive theory to explain children's health care utilization and propose parental insurance as an intervention that exerts its influence on this utilization through social cognitive theory pathways. This study will test whether there is a relationship between parental insurance and children's utilization but will not test whether it actually occurs through the mechanisms I propose. We must first understand whether there is a relationship between parental health insurance and children's utilization before we invest resources into understanding how that relationship operates. I will begin this chapter by providing a general description of social cognitive theory. I will follow that by discussing children's utilization in the context of social cognitive theory and end by proposing how health insurance for the primary parent might affect that utilization.

Social Cognitive Theory

Bandura hypothesized that both psychological (internal to the person) and environmental (external to the person) factors influence human behavior, and he labeled

this Social Cognitive Theory (SCT) (Bandura 1986). Bandura proposed these factors, which I will henceforth refer to as determinants, are continuously influencing each other and behavior, and behavior feeds back to influence the determinants. Bandura labeled this interaction as reciprocal determinism (Bandura 1986).

The psychological determinants are (a) behavioral capability, (b) self-efficacy, (c) outcome expectations, (d) outcome expectancies, (e) goals, and (f) reinforcements/punishments (Bandura 2004, Baranowski et al 2002). The environmental determinants are barriers/facilitators and reinforcements/punishments (Bandura 2004). Reinforcements/punishments appear in both lists because they can be psychological or environmental. For example, the pride experienced from earning a degree is a psychological reinforcement. The increase in salary that results from earning a degree is an environmental reinforcement. Each determinant is described below, and an illustration of the theory is found in Figure 1.

Knowledge and skills, also known as behavioral capability, precede behavior (Baranowski et al 2002, Bandura 1998). An individual must understand how to perform the behavior and have the skills to do it before she considers performing the behavior (Baranowski et al 2002, Bandura 1998). An individual is unable to engage in a behavior if she does not possess the knowledge and skills needed to perform the behavior.

An individual's belief that she can successfully perform a specific behavior is known as her self-efficacy or efficacy expectation (Bandura et al 1977). According to Bandura, self-efficacy is the foundation of behavior (Bandura 1998). Self-efficacy influences behavior directly as well as through its influence on the determinants goals, outcome expectations, and barriers (Bandura 1998). The strength of self-efficacy

determines what behaviors an individual will attempt and how long she will perform those behaviors (Bandura et al 1977). The strength of self-efficacy also determines the goals an individual sets for herself, the expected outcomes of a behavior, and the perceived size of barriers (Bandura 2004).

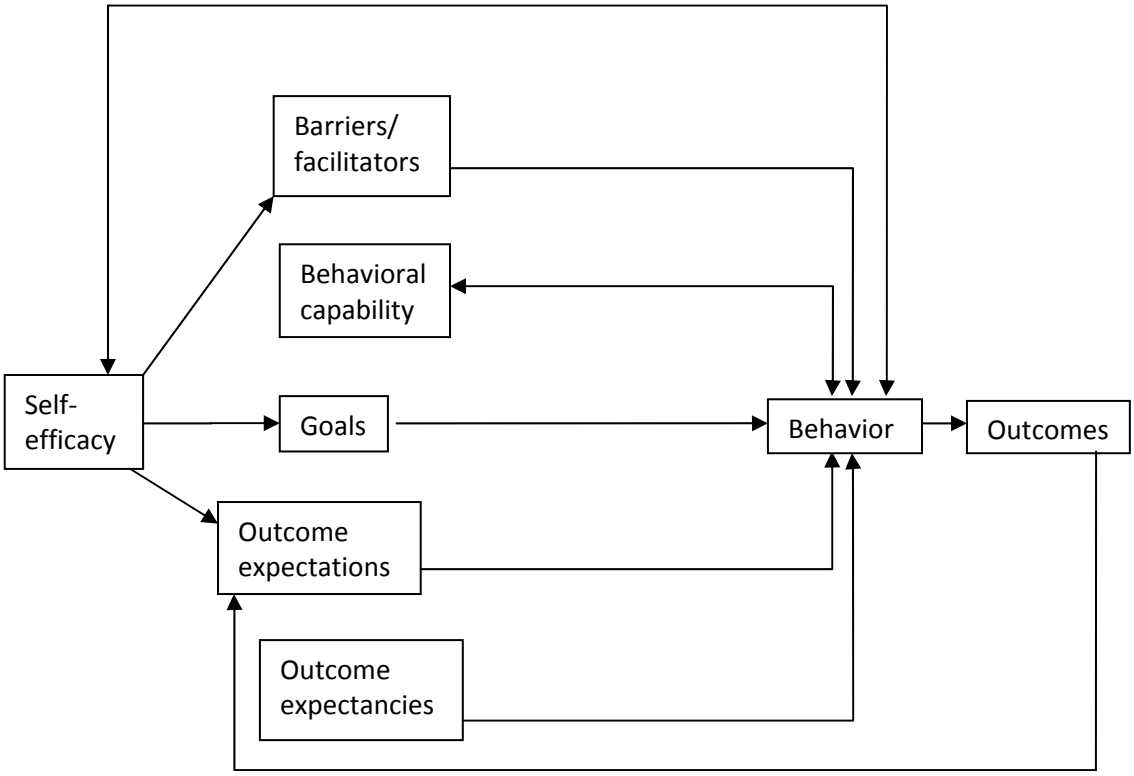

Figure 1. Social Cognitive Theory. Adapted from Bandura A. Health promotion from the perspective of social cognitive theory. Psychol Health 1998;13(4):623-649.

Self-efficacy is built through (1) performance accomplishments, (2) vicarious experience, (3) verbal persuasion, and (4) emotional arousal (Bandura 1977). Performance accomplishments or the actual performance of a behavior influences self-efficacy. Successful performance will strengthen self-efficacy, and unsuccessful

performance will weaken it (Bandura 1977). Of the four drivers of self-efficacy, performance has the greatest impact (Bandura et al 1977). One's self-efficacy is also built by observing another individual successfully perform the behavior, known as vicarious experience (Bandura et al 1977). Verbal persuasion, which is reassuring communication from another person that an individual can successfully perform the behavior, contributes to self-efficacy (Bandura et al 1977). A high degree of emotional arousal associated with the behavior in the form of anxiety or fear reduces self-efficacy (Bandura et al 1977).

Outcome expectations are an individual's beliefs about the outcomes that will occur as a result of behaviors the individual performs (Bandura et al 1977). For a future outcome to influence behavior, the individual has to anticipate the behavior will lead to the outcome. If the individual believes the behavior leads to a positive outcome, she is more likely to engage in that behavior. For example, if an individual believes her physician will prescribe an antibiotic that will make her feel better, she is more likely to go to the doctor when she is sick. Conversely, if the individual believes the behavior leads to a negative outcome, she is less likely to engage in that behavior, even if she strongly believes she can successfully complete the behavior. The individual may associate both positive and negative outcomes with a behavior. Each positive outcome an individual expects to result from a behavior increases the likelihood she will act, and each negative outcome the individual expects decreases the likelihood.

Outcome expectancies are the values an individual places on the outcomes of a behavior (Baranowski et al 2002). The likelihood of a behavior depends on how much an individual values the outcome of that behavior. The higher the value an individual places

on a desired outcome, the more likely the individual is to perform the behavior leading to that outcome (Williams et al 2005). Conversely, the higher the value the individual places on avoiding an outcome, the less likely the individual is to perform the behavior.

Barriers are the factors in the environment that hinder an individual's performance of the behavior (Bandura 2004). For example, if a person's physician exhausts their supply of influenza vaccinations, it is more difficult for that person to be immunized. The more barriers an individual faces, the less likely the person is to engage in the behavior. Also, the stronger a barrier, the less likely the individual is to perform the behavior. Facilitators are the opposite of barriers. They are factors that aid the completion of the behavior. For example, if influenza vaccinations are provided at the workplace, that would facilitate the individual's receipt of an influenza vaccination. The more facilitators, the more likely the behavior is performed. The stronger the facilitator, the more likely the individual is to perform the behavior.

Goals serve as guides for an individual's behavior (Bandura 2004). They give an individual purposeful direction for his or her behavior. Long-term goals are too abstract to control current behavior, so short-term goals are set for this purpose. Behaviors that move an individual toward his or her goals are more likely to be undertaken than behaviors that do not contribute to goal achievement.

Performance of a behavior leads to outcomes which include physical outcomes, social reactions, and self-evaluative reactions (Bandura 2004). These outcomes influence future behavior. The outcomes that encourage performance of the behavior are reinforcements, and the outcomes that discourage performance are punishments (Bandura 1998). Reinforcements can be positive or negative (Baranowski et al 2002). A positive

reinforcement is a reward received for performing the behavior. A negative reinforcement is the removal of a negative stimulus. Reinforcements and punishments are learned through personal experience, vicarious experience, and self reinforcement (Baranowski et al 2002).

Each of the determinants contributes to behavior by increasing or decreasing the likelihood of the behavior, but how much influence a given determinant has depends on the particular behavior. Barriers may be more prohibitive for behavior A than for behavior B. However, across all behaviors, the two SCT determinants currently regarded as exerting the greatest influence are self-efficacy and outcome expectations (Predicting Health Behaviour: Research and Practice with Social Cognition Models. 2005). This explains why current studies often focus on one or both of these determinants as predictors of behavior (Basen-Engquist et al 2011, Annesi 2011, White et al 2011, Byrd-Bredbenner et al 2011, Hogenmiller et al 2007).

Social Cognitive Theory and Children's Utilization

SCT can be used to explain any behavior, including health-related behaviors (Bandura 2004). I will discuss the application of SCT to children's health care utilization after a brief explanation of the process leading to utilization and the role of parents in the process.

There is a process leading up to a child having a visit with a health care provider. The steps in this process are deciding care is needed, choosing a provider, making an appointment with the provider (if appointment necessary), and getting to the provider. The process culminates in contact with a health care provider where the health care service is delivered. I will henceforth refer to this contact as a health care encounter. An

adult proceeds through these steps when he or she sees a health care provider. In the case of children, it is their parents that proceed through these steps. Parents are the primary decision makers for their children's health (Hanson 1998, Lorenc et al 2009, Case and Paxson 2002). Parents decide whether the child needs care, decide what provider the child sees, make the appointment, and take the child to the encounter. Typically, it is the child's mother that is responsible for the child's care (Wyn et al 2003). Older children may be involved in the process, but whether the child has the encounter ultimately rests with the parents. Young children have no involvement in the decision process, though the parent may consider the characteristics of the child when making the decision to seek care. Because parents decide whether a child has a health care encounter, I propose the determinants of children's health care encounters are those of the parents. For example, it is a parent's self-efficacy for arranging a health care encounter that increases or decreases the likelihood her child will have an encounter.

Now I will explain children's health care encounters using SCT. I will describe each determinant's impact on children's encounters, and when available, I will give the results of studies examining the link between the determinant and children's encounters.

Behavioral Capability

The parent's knowledge and skills determine whether her child has a health care encounter. If the parent has sufficient knowledge and skills, the likelihood the child will have an encounter increases. If the parent does not have sufficient knowledge and skills, the likelihood the child will have an encounter decreases. The parent must understand when care is needed and be able to choose a provider, make an appointment, and get to the provider. In the case of well-child visits, parents may not know when such visits are

recommended or may believe these visits are only recommended for young children (Earle and Burman 1998). Parents may also believe sports physicals or sick visits substitute for well-child visits (Earle and Burman 1998).

Self-Efficacy

A parent's self-efficacy is expected to affect the likelihood her child will have a health care encounter. If the parent is confident in her ability to arrange a health care encounter, her child is more likely to have an encounter. If she lacks confidence, her child is less likely to have an encounter. Janicke and Finney demonstrated an association between parent's self-efficacy for accessing physician assistance and children's primary care visits (Janicke and Finney 2003). Self-efficacy was predictive of the number of encounters children had with their primary care providers, with increases in self-efficacy producing increases in number of encounters, controlling for the interaction between parental stress and parental self-efficacy, child behavior problems, child medication use, and parental health care encounters. While there are limitations to the measurement of self-efficacy in their study, it demonstrated a link between self-efficacy and children's health care encounters.

Outcome Expectations

The outcomes a parent expects from her child's health care encounter increase or decrease the likelihood the child will receive an encounter. The anticipated outcomes will vary from parent to parent. An outcome one parent associates with the encounter may not be shared by other parents. The expected outcomes include consequences for the child as well as the parent. A parent may anticipate her child's physician visit will lead to an improvement in her child's health. She may also anticipate that same visit will

relieve her own anxiety about the child's health and improve her knowledge about children and parenting (Janicke and Finney 2003, Earle and Burman 1998). These are examples of positive anticipated outcomes, but a parent may anticipate negative outcomes as well. An example of a negative outcome is the parent feeling discriminated against by the provider (Guendelman et al 2006). When the positive anticipated outcomes outweigh the negative anticipated outcomes, the child is more likely to receive an encounter. Janicke and Finney examined whether parents' outcome expectations for visits were predictive of children's primary care visits (Janicke and Finney 2003). Surprisingly, parent outcome expectations were not associated with the number of encounters children had with their primary care providers. Outcome expectations were assessed using an 11-item questionnaire completed by the children's parents. The measure of outcome expectations used in the analysis was the combined score for all the items, but the exploratory factor analysis revealed 3 factors. This means the measure was (a) detecting more than just outcome expectations or (b) detecting three different components of outcome expectations. If more than just outcome expectations were captured by the measure, the effects of outcome expectations may have been blunted by the effects of other determinants included in the measure. In addition, the instrument had not been validated, so it is unclear if the instrument even measured outcome expectations. The authors admit there was not enough focus on the outcomes related to the child's health in the measure. Thirdly, the sample size may have been too small to detect a statistically significant correlation. These reasons may explain why outcome expectations were not associated with encounters in this study as expected.

Outcome Expectancies

The valuation the parent places on the outcomes of an encounter increases or decreases the likelihood the child will receive an encounter. If the parent does not value the expected outcome, such as prevention of an infectious disease from an immunization, the child is less likely to have an encounter. However, if the parent highly values the outcome, such as reassurance her child is healthy, it increases the chances the child will have an encounter leading to that outcome.

Barriers

Barriers are the environmental or personal factors that impede the child from receiving an encounter. The more barriers that exist, the less likely the child is to have a health care encounter. Barriers to encounters include the out-of-pocket expense for the encounter, family income, health/ability of the primary parent, provider accepting the child's insurance, distance to a provider, hours the provider is available, availability of transportation, employment of the primary parent and ability to take time off work, and availability of care for other children (DeVoe et al 2008, Earle and Burman 1998). Even with insurance, the out-of-pocket expense for medical care for a child can be prohibitive. Lower income parents may find it more difficult to pay for their children's encounter than higher income parents. Compared to children from higher income families, children of lower income families are at greater risk for going an entire year without visiting a physician (DeVoe et al 2009, Hanson 1998). If a parent's health limits her activities, this makes it more difficult for her to take her child for an encounter. Some providers do not accept reimbursement through Medicaid, so parents may have difficulty finding a provider that will see their children with this type of coverage (DeVoe et al 2008). Lack

of transportation is also a barrier (Earle and Burman 1998). If a parent is employed, it may be more difficult for this parent to attend an encounter with her child. Children with an employed parent are at greater risk of not having a physician visit (DeVoe et al 2009, Hanson 1998).

Goals

If taking the child for an encounter helps the parent achieve his or her goals, the child is more likely to have a health care encounter. For example, if a parent's goal is to keep her children as healthy as possible, visits to the doctor when the child is ill and preventive visits will help her achieve this goal.

Reinforcements

The outcomes resulting from a child's health care encounter shape a parent's expectations about the outcomes of that particular encounter. Reinforcements increase the likelihood the parent will expect positive outcomes with future encounters. Punishments have the opposite effect. For example, if a parent takes her child to be vaccinated against influenza and the child gets sick afterward, the parent may associate the child's illness with the vaccination. The parent may expect the child will get sick if she gets vaccinated again.

Parental Health Insurance and Children's Health Care Encounters

By revealing the determinants of behavior and their impact on behavior, SCT provides guidance for designing effective interventions to change behavior (Bandura 1998). Interventions that alter a determinant increase the likelihood of behavior change. Because parents decide whether a child has a health care encounter, it is reasonable to direct interventions at parents when changes in the number or type of children's

encounters are desired. Specifically, it makes sense to target the intervention at the primary parent because this is the parent responsible for the child's health care. Typically, this is the child's mother (Wyn et al 2003). The intervention I am interested in is health insurance for the primary parent. I propose parental health insurance indirectly affects children's health care encounters through its impact on parental utilization of health care encounters. Increased parent utilization subsequently alters barriers, behavioral capability, self-efficacy, outcome expectations, and outcome expectancies, increasing children's encounters. Parental health insurance can also directly affect children's encounters by reducing barriers. I will explain how parental health insurance for the primary parent can affect each of these determinants. The impact of parental health insurance on the determinants is illustrated in Figure 2.

Barriers

Health insurance for the primary parent may remove barriers that prevent the child from receiving health care encounters. These barriers are lack of available income and poor health of the parent. They will be described in the following paragraphs.

Lack of Available Income

Families in which at least one member is uninsured tend to be low income (Committee on the Consequences of Uninsurance 2002). Low income families struggle financially to provide for even their families' basic needs due to their limited incomes (Perry and Paradise 2007). Medical expenses for an uninsured family member put even more stress on the family finances. The uninsured are typically responsible for the full price of the care they receive, and these expenses can consume a substantial portion of the family income (Kaiser Commission on Medicaid and the Uninsured 2009b). Eleven

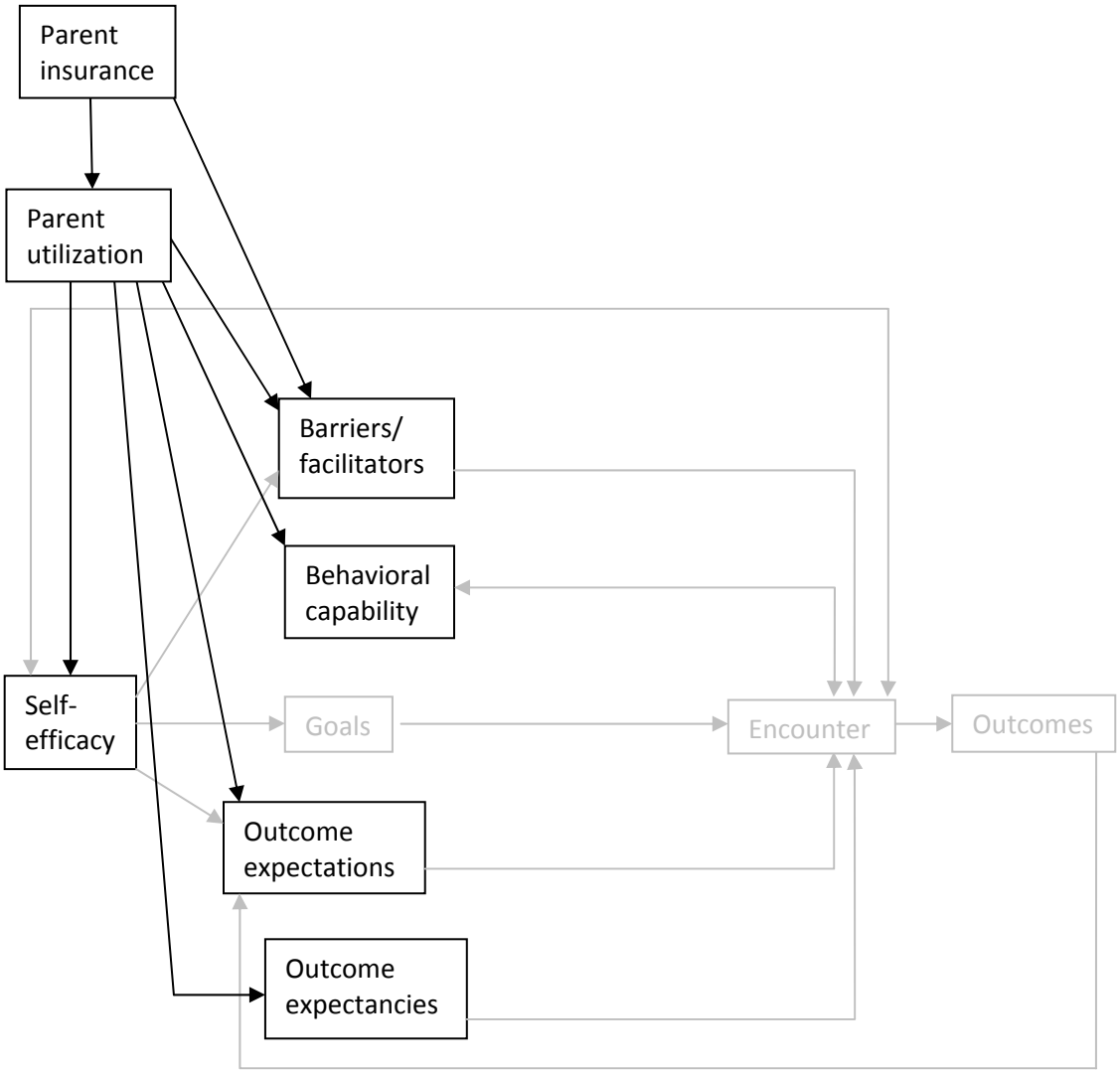

Figure 2. Children's Health Care Utilization with Parental Insurance Intervention. Adapted from Bandura A. Health promotion from the perspective of social cognitive theory. Psychol Health 1998;13(4):623-649

percent of families with an uninsured family member spend at least 5% of their income on medical expenses, and five percent spend at least 10% of their income (Committee on the Consequences of Uninsurance 2002). Faced with medical bills for an uninsured member, families are forced to make decisions about which household bills to pay, and

some choose to forgo basic necessities to pay for that family member's medical care (Kaiser Commission on Medicaid and the Uninsured 2009b). A family with an uninsured parent that is struggling to afford that parent's medical expenses will be reluctant to incur any additional expenses that are not absolutely necessary, including some health care encounters for the children. Even if the children are insured and their encounters are available at no cost, the family may still be unable to afford expenses associated with the encounter like transportation. This explains one way having an uninsured parent can reduce a child's health care encounters.

A way to increase the health care encounters of the children described in the previous paragraph is to reduce the amount of the family's income that goes toward the uninsured parent's medical expenses, freeing income to be used on the children. This can be accomplished by insuring the parent, assuming the out-of-pocket expenses and premiums sum to less than the family was previously paying. The average yearly out-of-pocket expenses for those with private insurance and Medicaid are less than for the uninsured, supporting that assumption (Paez et al 2009). Regarding premiums, only parents in Medicaid above 151% FPL can be charged premiums (Solomon 2007). On average, families below this income level will therefore spend less once the uninsured parent enrolls in Medicaid. Whether families will spend less once an uninsured parent obtains private insurance depends on how much the family has to contribute toward premiums.

Poor Health of the Parent

The primary parent is the parent who typically takes a child for health care encounters. However, if this parent feels too unwell or is physically unable to take the

child, the parent's health becomes a barrier for the child. A parent may be in poor health due to lack of medical care, and this lack of care could be attributable to lack of insurance. Nearly half of uninsured adults have a chronic condition, and 45% of uninsured low-income parents have a chronic condition (Davidoff and Kenney 2005, Schwartz 2007). The uninsured with chronic conditions or injury get less care and have worse outcomes than the insured (Hadley 2007). Some uninsured adults indicate they do not see a physician when they have an illness (Committee on the Consequences of Uninsurance 2002). Twenty-one percent of low-income uninsured parents delayed or avoided care due to cost in one survey (Schwartz 2007). Doing so led to limitations in work or other activities in 31% of those parents and disability in 13%.

This explains why a primary parent lacking insurance may prevent a child from having health care encounters. However, when the primary parent becomes insured, her health care encounters may increase. As mentioned above, health insurance reduces the price of the care for the parent. The price may fall enough that she can afford the care she desires, and subsequently she has health care encounters she was not previously getting. Research has shown the likelihood of encounters such as physician visits, laboratory tests, mammograms, and prostate examinations increases when uninsured individuals become insured (Kahn et al 2007, Freeman et al 2008, McWilliams et al 2003). When the parent has more health care encounters after becoming insured, her health may improve enough that she can take her child for encounters. Parental health insurance potentially removes the barrier of poor health through increased health care encounters by the parent, and the removal of this barrier allows the child to receive health care encounters.

Behavioral Capability

The reduction in out-of-pocket cost for a health care encounter once a parent is insured makes it easier for a parent to get care for herself. I assume a parent who increases her encounters after becoming insured already has some behavioral capability for her own encounters, or she would not increase those encounters once insured. This parent at least knows she needs care, knows there is a provider able to care for her, knows how to make an appointment with that provider, and knows how to get to that provider. She may not be aware of other encounters she needs or who can provide those encounters. Furthermore, she may not know certain encounters like well-child visits are available and recommended for her child, and she may not be aware of who can provide the services (Earle and Burman 1998, Committee on the Consequences of Uninsurance 2002). Under those circumstances, the chances of those encounters are slim. However, when the parent seeks care for herself, she is likely to be exposed to new information (Schwartz 2007). She may learn new health-related information from her physician, or if her physician refers her for other services, she builds behavioral capability for understanding what other encounters are available, deciding when they are necessary, determining who provides them, arranging her schedule to accommodate them, and physically travelling to them. This is knowledge she will be able to apply to future encounters for herself as well as her child. During her interactions with the health care system, she may also be exposed to new information regarding her child's health. For example, if her provider also cares for children, she may see information displayed in the office promoting influenza vaccinations for children. This explains how increased utilization by a parent can translate into increased behavioral capability and increased

likelihood a child will have an encounter. It will take time for a parent's behavioral capability to develop and have an effect on her child; it does not increase simply because a parent becomes insured.

Self-Efficacy

A parent with low self-efficacy for arranging encounters is unlikely to have an encounter. The parent that increases her encounters after becoming insured has at least a minimum level of self-efficacy for these behaviors, otherwise she would not increase her visits once insured. Regardless of the level of self-efficacy, successfully completing the process of deciding care is needed, selecting a provider, making an appointment with that provider, and getting to that provider represents a performance accomplishment. The successful execution of these behaviors bolsters a parent's self-efficacy to have a health care encounter. As a result of having more encounters once insured, the parent's self-efficacy increases. The increased confidence to arrange an encounter for herself should translate to increased confidence to arrange an encounter for her child, which increases the likelihood the child will have a health care encounter.

An uninsured parent may have low self-efficacy for recommendations made by her provider if her encounters with that provider are infrequent. Individuals are less likely to have a usual source of care and less likely to visit a physician when they are uninsured compared to when they are insured (Kahn et al 2007, Freeman et al 2008). A parent is unlikely to believe her provider knows her very well if their contact is minimal. Because a patient's trust in a provider is shaped by the patient's perception of how well the provider knows her, the uninsured parent may not have much trust in her provider (Berry et al 2008). Trust in a provider is linked to self-efficacy for the provider's

recommendations (Lee and Lin 2009). One of the ways self-efficacy is built is through verbal persuasion (Bandura 1977). A parent who trusts her provider may be more receptive to messages by the provider, forging a link between trust and self-efficacy. The parent with low trust is less likely to be persuaded by her physician's prompts and probably also has low self-efficacy for recommendations made to her. If this provider is the same person that cares for her child, the uninsured parent's lack of trust presumably spills over to recommendations made by the provider about the child. As a parent's encounters increase after becoming insured, she will probably believe the provider knows more and more about her. This may translate into greater trust and self-efficacy for recommendations made by the provider, including those related to her child. For example, if the provider recommends annual well-child visits, the parent with more trust is apt to feel more confident she can follow this recommendation than a parent with less trust. This is another way parental insurance can influence children's encounters through its effects on self-efficacy.

Outcome Expectations

A parent that expects negative outcomes or only minimal positive outcomes from a child's encounter is less likely to arrange an encounter for her child. A parent that has minimal experience with health care encounters, such as an uninsured parent, may not expect many positive outcomes from an encounter because the parent has not had many opportunities to experience positive outcomes. Once the parent becomes insured and has more health care encounters, she may experience an outcome from an encounter that changes her expectations of the outcomes that result from that encounter. For example, the parent may be diagnosed with a particular hereditary condition during a preventive

physical examination. This parent may come to associate a preventive physical examination with positive outcomes, prompting her to arrange a health care encounter for her child.

Trust in provider is also associated with outcome expectations. Less trust in a provider is associated with lower expectations of positive outcomes by following provider recommendations (Lee and Lin 2009). As previously explained, an uninsured parent may have less trust in her provider. As her trust grows with increased utilization and familiarity after becoming insured, her outcome expectations rise, prompting her child to receive a health care encounter.

Outcome Expectancies

A parent that has minimal experience with health care encounters, such as an uninsured parent, may not realize the implications of certain health conditions. As a parent increases her utilization of care after becoming insured, she may be exposed to new information she did not previously have. This information could come from the provider or the institution where the provider is located, such as posters regarding a health issue. For example, the parent may learn that influenza infection can be deadly for young children. As a result, the parent may value the avoidance of influenza more than she did previously and take steps to reduce her child's risk, such as take her child for an influenza vaccination. The more a parent values the outcomes of her child's health care encounter, the more likely the child is to have that encounter.

In summary, I have just described the determinants health insurance for the primary parent is proposed to affect and how. For parental insurance to affect a given child's encounters, it must influence the determinant or determinants that are preventing

the child from having the encounter, and the determinant(s) must be increased or decreased sufficiently to induce behavior change. If the only reason a child is not receiving well-child visits is because her mother does not have a car, parental insurance will not help that child have a well-child visit. If a mother learns about the available providers in her area and how to schedule appointments as a result of becoming insured but still never learns a well-child visit is recommended for her ten-year-old son, he will not have that visit. Thus, a parent gaining insurance does not guarantee a child will receive a specific encounter like a well-child visit. Additionally, it will take time for a change in a parent's insurance status to translate into a change in the parent's determinants and the child's encounters. An effect may not be seen immediately after a parent becomes insured.

Well-Child Visits

Parental health insurance can have an impact on any health care encounter. The encounters of interest in this study are well-child visits and physician visits for asthma in children with asthma. Well-child visits will be discussed first. Well-child visits are preventive visits designed to screen for health problems and assist in maintaining health through delivery of physical examinations, laboratory tests, hearing and vision screenings, behavioral assessments, education, and immunizations. Children of all ages receive well-child visits. The American Academy of Pediatrics currently recommends annual well-child visits for children three through twenty-one years, with more frequent visits recommended for younger children (American Academy of Pediatrics 2008). The prior guidelines were similar except they did not recommend well-child visits for seven- and nine-year-old children (American Academy of Pediatrics 1999).

Parental insurance impacts well-child visits via the mechanisms described previously. Without insurance, barriers may exist for the parent that prevent the child from receiving a well-child visit. These include a lack of available income and poor health of the parent. Parents may not be aware well-child visits are recommended for their children or where those visits are available, but their awareness may be increased as their own encounters increase after becoming insured (Earle and Burman 1998). The parents may see an informational poster about well-child visits in the provider's office. Parents' trust in their providers may be strengthened as they build a relationship with their providers, so if these providers recommend well-child visits, the parents are more likely to accept these recommendations. As the parent gains more experience arranging encounters for herself, she will gain confidence in her ability to arrange encounters for her child. If the parent sees a provider and is diagnosed with a condition that her child might also get, she may expect more positive outcomes from well-child visits that can screen for this condition and detect it early. The parent may also value prevention of the condition more after she has it, which might induce her to arrange a well-child visit for her child.

Physician Visits in Children with Asthma

Nearly seven million children had asthma in 2007 (Akinbami et al 2009). Asthma is an ambulatory care sensitive condition, meaning if managed properly on an outpatient basis, hospital admissions can be avoided (Friedman et al 1999). Yet asthma is responsible for two percent of all emergency department visits for children and nearly six percent of hospitalizations (Akinbami et al 2009). In an effort to reduce asthma-related morbidity and mortality, the National Asthma Education and Prevention Program

recommends a health care professional regularly monitor all children with asthma (National Asthma Education and Prevention Program 1997, National Asthma Education and Prevention Program 2007). Even those with mild or intermittent asthma should be assessed at a minimum of every six months, and more frequent visits are required in patients with severe disease. This means all children with asthma should have at least two physician encounters per year. The prevalence of the disease coupled with a recommendation that applies to all children with asthma regardless of severity is the reason this condition was chosen for study. Parental health insurance is proposed to affect physician visits via the same mechanisms as previously described.

Literature Review

A discussion of the ten studies that have examined the relationship between parental health insurance and children's health care encounters will be provided in the following paragraphs. The health care encounters examined in these studies are well-child visits, physician visits, emergency room visits, hospital admissions, dental visits, and prescription medications.

Well-Child Visits

Gifford and colleagues used data from the nationally representative 1996 Medical Expenditure Panel Survey (MEPS) to examine whether children 12-71 months in families earning less than 200% of the FPL had a well-child visit during the year (Gifford et al 2005). Children included in the study were those with a full year of coverage under Medicaid or lacking coverage for the entire year. The same requirements had to be met by the children's primary parents, creating three groups for comparison: parent-child uninsured, child-only insured, and parent-child insured. The sample size was 380

children, with the primary parent being the child's mother for 371 children. In the parent-child uninsured group, 29% of children received a well-child visit during the year. In the child-only insured and parent-child insured groups, 41% and 62% of children, respectively, had a well-child visit. From a multivariate logit regression predicting receipt of a well-child visit, the parameter estimate for parent-child insured, compared to parent-child uninsured, was $\beta=1.93$ ($p<0.01$). The parameter estimate for child-only insured, compared to parent-child uninsured, was $\beta=0.73$ ($p<0.10$). The difference between these two parameters was statistically significant ($p<0.01$), indicating a child enrolled in Medicaid whose primary parent is also enrolled in Medicaid is more likely to have a well-child visit than a child enrolled in Medicaid whose primary parent is uninsured.

A second study examined the association between primary parents' insurance and well-child visits (Davidoff et al 2003). Davidoff and colleagues examined physician visits and well-child visits, a subset of physician visits, in children from families earning less than 200% of the FPL, but this study included children through the age of 17 (Davidoff et al 2003). These children were also required to be insured for an entire year, but that insurance could come from any source, as long as it was the same source all year. Primary parents' insurance status was based on their current insurance coverage, which could come from any source. The data for this study came from the 1999 National Survey of America's Families (NSAF), and the sample size was 9339 children. Children belonged to one of three groups: parent-child uninsured, child-only insured, and parent-child insured. There were subgroup analyses for privately and publicly insured children. Among the parent-child uninsured, 34.1% received a well-child visit during the past year.

Among the child-only insured, 59.2% of privately insured and 72.3% of publicly insured children had a well-child visit. Among the parent-child insured, 62.5% and 79.1% had a well-child visit, respectively. From a multivariate logit regression predicting receipt of a well-child visit for insured children, the parameter estimate for parental insurance was $\beta=0.215$ ($p\leq0.10$).

Gifford and colleagues found a link between parental health insurance and well-child visits, but the results from Davidoff and colleagues are less clear (Davidoff et al 2003, Gifford et al 2005). A relationship was found but not at the 5% significance level. One potential explanation for the weak relationship in the study by Davidoff and colleagues is insured parents were not required to be insured the entire year in which well-child visits were measured, whereas they were required to be insured the entire year in Gifford et al (Davidoff et al 2003, Gifford et al 2005). However, the failure of Davidoff and colleagues to find a relationship may not be incorrect; instead, there may not be a relationship, and the results from Gifford and colleagues may be biased (Davidoff et al 2003, Gifford et al 2005). Gifford et al failed to account for confounding variables that might be responsible for the observed relationship between parental insurance and well-child visits (Gifford et al 2005). One of these confounding variables is parental health. Parental health influences a parent's eligibility for coverage as well as whether she chooses to be insured. It also influences how much difficulty she has arranging a health care encounter for her child. A second confounding variable is a parent's expectations about the outcomes of medical care. A parent with strong expectations for positive outcomes with medical care who expects to use medical care may be more likely to get insurance and may also be more likely to arrange health care

encounters for her child. A third confounding variable is the parent's employment. Employment affects the parent's access to employer-sponsored insurance and also affects whether the child receives a visit because the time the parent has available to take the child increases or decreases with employment. A fourth confounding variable is the parent's aversion to risk. A parent's aversion to risk influences whether she purchases health insurance as well as the steps she takes to reduce the risk of future illness. Davidoff and colleagues addressed this confounding by comparing the results of their logistic regression analysis to an instrumental variables analysis and found the results of the two analyses were similar (Davidoff et al 2003).

Physician Visits

Davidoff and colleagues examined total physician visits in addition to well-child visits. Among the parent-child uninsured, 45.2% had a physician visit during the past year (Davidoff et al 2003). Among the child-only insured, 69.8% of privately insured and 82.4% of publicly insured children had a physician visit. Among the parent-child insured, 82.3% and 87.2% saw a physician, respectively. From a multivariate logit regression predicting at least one physician visit during the year for insured children, the parameter estimate for parental insurance was $\beta=0.348$ ($p\leq0.05$).

Hanson also examined physician visits. The data for this study came from the 1990 National Health Interview Survey (Hanson 1998). It examined physician visits in 13,021 children less than 18 years old. There were no income limits, but only privately insured children were included in the study. Primary parents' and children's insurance status was measured at the time of survey, so neither was required to be insured the entire year in which encounters were measured. No difference in the likelihood of a physician

visit during the year was found between parent-child insured and child-only insured (odds ratio 0.97, not statistically significant).

DeVoe and colleagues examined physician visits in insured and uninsured children from 1 to 18 years in Oregon using the Children's Access to Health Care Survey from 2005 (DeVoe et al 2008). Children from families earning <185% of the FPL were eligible. The insurance status of the parent that completed the survey was examined. Although not explicitly stated, it seems likely this was the primary parent. Insurance for the parent and child reflected insurance status at the time of survey; neither was required to be insured for the entire year in which physician visits were measured. Parent's insurance was not a predictor of physician visits in the multivariate analysis (OR 1.18, 95% CI 0.80-1.76). This result was also published in an earlier article (Devoe et al 2007).

DeVoe, Tillotson, and Wallace examined 43,509 children from two to seventeen years of age using the Medical Expenditure Panel Survey-Household Component from 2002-2006 (DeVoe et al 2009). All incomes and types of insurance were included. Parent and child insurance status on December 31 of the given year were measured. The authors compared physician visits between three groups of insured children. One group included children in two-parent families where both parents were insured and one-parent families where the parent was insured (henceforth referred to as *all parents insured*). This means the primary parents for these children were insured. Another group included children in two-parent families where both parents were uninsured and one-parent families where the parent was uninsured (henceforth referred to as *no parents insured*). The third group included children in two-parent families where one parent was insured

and one parent was uninsured; the insured parent was not necessarily the primary parent. Children in the *no parents insured* group were no more likely to go an entire year without seeing a physician than children in the *all parents insured* group (OR 1.10, 95% CI 1.00-1.22).

Guendelman and Pearl used the 2000 National Health Interview Survey to examine physician visits in 4560 low-income (≤200% of the FPL) children under 18 years who had at least one employed parent (Guendelman and Pearl 2004). Children and their parents were not required to be insured the entire year in which encounters were measured; they were only required to be insured at the time of survey. Any type of insurance was included. The authors compared physician visits during the year between two groups of insured children. One group included children from two-parent families where at least one parent was insured and from single-parent families where the parent was insured. Thus, in the two-parent families, it is unclear if the primary parent was insured. The other group included children from families in which no parents were insured. The probability of children in less than excellent health going an entire year without seeing a physician did not differ between the two groups (marginal effect 3%, 95% CI -6% to 2%). The probability for children in excellent health did not differ either (marginal effect 2%, 95% CI -7% to 5%).

Guendelman and colleagues used the 2001 California Health Interview Survey to examine physician visits in 5521 low-income (<200% of the FPL) children under 18 years living in California (Guendelman et al 2006). Children and their parents were not required to be insured the entire year in which encounters were measured; they were only required to be insured at the time of survey. Any type of insurance was included. The

authors compared physician visits between two groups of insured children. One group included children in two-parent families where at least one parent was insured and from single-parent families where the parent was insured. The other group included children from families where no parents were insured. The likelihood of children in either group going an entire year without seeing a physician did not differ (OR 1.1, 95% CI 0.8 to 1.6).

An analysis by the United States Government Accountability Office (GAO) used data from the 2005-2007 Medical Expenditure Panel Survey-Household Component (Yocom 2011). Children were included if they and their parents did not have a change in insurance coverage over a 12-month period. They were allowed to be uninsured, privately insured, or publicly insured. The likelihood of having an office-based visit in the past year did not differ between publicly insured children with publicly insured or uninsured parents (OR 1.10, 95% CI 0.93 to 1.31). The likelihood of having an office-based visit did not differ between privately insured children with privately insured or uninsured parents (OR 1.40, 95% CI 0.86 to 2.27).

Zimmerman looked specifically at visits to mental health care providers, though the sample was not limited to children with a mental health diagnosis (Zimmerman 2005). The data were from the National Longitudinal Survey of Youth and the Child/Young Adult supplement (NLSY-C/YA), and the included children were 7-14 years old (Zimmerman 2005). The likelihood of a mental health visit in the past two years did not differ between children with privately insured and uninsured parents (OR 0.409, p=.097) and did not differ between children with publicly insured and uninsured parents (OR 1.119, p=.822).

Potential Explanations for Lack of Relationship to Physician Visits

Only the study by Davidoff and colleagues found a relationship between parental health insurance of the primary parent and children's physician visits (Davidoff et al 2003). I will provide potential explanations for the lack of relationship in the five remaining studies in this and the following paragraphs. One potential explanation is Davidoff and colleagues included only continuously insured children (Davidoff et al 2003). With the exception of the GAO analysis, the children in the other studies were not required to be insured the entire year, which means there may have been gaps in their coverage (DeVoe et al 2009, DeVoe et al 2008, Guendelman and Pearl 2004, Hanson 1998, Devoe et al 2007, Guendelman et al 2006, Zimmerman 2005, Yocom 2011). Children with gaps in coverage are more likely to go an entire year without a physician visit than continuously insured children (Olson et al 2005). A child's lack of insurance may be such a barrier to physician visits that it overrides any potential effect of parental insurance. A relationship between parental coverage and children's physician visits may only exist in children who are continuously insured.

An explanation for the lack of relationship in the studies by Hanson, Yocom (GAO), Zimmerman, and DeVoe, Tillotson, and Wallace is the inclusion of higher income children (DeVoe et al 2009, Hanson 1998, Zimmerman 2005, Yocom 2011). Yocom, Zimmerman, and DeVoe, Tillotson, and Wallace included families above 200% FPL, though they did not specify what proportion of the sample was made up of higher-earning families (DeVoe et al 2009, Zimmerman 2005, Yocom 2011). Few families in the Hanson study were poor (Hanson 1998). Only 2.7% of the insured children in this study belonged to families with incomes below 100% of the FPL, whereas close to 40%

of the children in the study by Davidoff and colleagues belonged to families earning 100% of the FPL or less (Davidoff et al 2003). The remainder of families in the Davidoff and colleagues study earned less than 200% of the FPL (Davidoff et al 2003). Parental insurance may matter in low-income families but not higher-income families. For lower income families, lack of income and lack of time from working to increase income may be barriers that are limiting factors for physician visits. If lower income families can alleviate these barriers with parental insurance, then children in these families may be able to receive physician visits. For higher income families, this limiting barrier may not exist. Because higher income families were included in the studies by Hanson, Yocom, Zimmerman, and DeVoe, Tillotson, and Wallace, any relationship in poor families may have been washed out by a lack of relationship among higher income families (DeVoe et al 2009, Hanson 1998, Zimmerman 2005, Yocom 2011). No subgroup analyses were conducted in any of the studies.

The majority of families in which at least one parent is insured have all parents insured (DeVoe et al 2009). While this means the majority of primary parents were insured in families in which at least one parent was insured, there were likely some insured families in the studies by Guendelman and colleagues where only the nonprimary parent was insured (Guendelman and Pearl 2004, Guendelman et al 2006). This may explain why a relationship was not found between parental insurance and physician visits in these studies. While the insurance status of the nonprimary parent is expected to have an effect on the child's health care encounters, this effect is expected to be smaller than the effect of the primary parent. Insurance for the nonprimary parent will not remove the barrier of poor health for the primary parent that takes the child to encounters.

Furthermore, the increases in behavioral capability, self-efficacy, outcome expectations, and outcome expectancies of the primary parent through increased personal experience with health care encounters when insured are expected to be greater than increases achieved through influences of the nonprimary parent who is insured and has more encounters.

The final explanation for why a relationship was not found in most of the studies is because a relationship does not exist. It is possible parental insurance has no effect on physician visits in the populations studied or no effect on physician visits in any population. The results from Davidoff and colleagues have not been confirmed by another study (Davidoff et al 2003). The authors found low-income children who are continuously insured with insured primary parents are more likely to have a physician visit than children with uninsured parents, but more evidence is needed to verify if this is true. Studies are needed to see if parental insurance has an effect when parents are continuously insured and when higher-income children are continuously insured.

Emergency Department Visits and Hospital Admissions

Both studies by Guendelman and colleagues examined emergency department visits (Guendelman and Pearl 2004, Guendelman et al 2006). In one study, the probability of children in less than excellent health having two or more emergency department visits in a year did not differ between children in families where at least one parent was insured and families where no parents were insured (marginal effect 3%, 95% CI -6% to 2%) (Guendelman and Pearl 2004). The probability for children in excellent health did not differ either (marginal effect 0%, 95% CI -3% to 6%) (Guendelman and Pearl 2004). In the other study, the likelihood of children in families where at least one

parent was insured and children in families where no parents were insured having an emergency department visit in the past year did not differ (OR 1.0, 95% CI 0.7 to 1.3) (Guendelman et al 2006). Mistry and collaborators used data from the 2000 Medical Expenditure Panel Survey-Household Component (Mistry et al 2005). The number of emergency department visits did not differ between children with privately insured and uninsured parents (IRR 0.90, 95% CI 0.56 to 1.44). Yocom did not find differences between the likelihood of insured children with insured and uninsured parents having an emergency department visit (Yocom 2011). Publicly insured children with publicly insured parents were no more likely to have a visit than the children with uninsured parents (OR 1.06, 95% CI 0.86 to 1.29). The lack of relationship may be because there is no relationship for any child or there is no a relationship in the children studied.

Guendelman and colleagues also examined hospital admissions (Guendelman et al 2006). The likelihood of children in families where at least one parent was insured and children in families where no parents were insured having a hospital admission in the past year did not differ (OR 1.3, 95% CI 0.8 to 2.1). The same explanation given in the previous paragraph for a lack of relationship with emergency department visits applies to hospital admissions.

Dental Visits and Prescription Medications

Two studies examined dental visits (DeVoe et al 2009, Guendelman et al 2006). Children in the *no parents insured* group were no more likely to visit a dentist less than once per year than children in the *all parents insured* group (OR 1.13, 95% CI 0.97-1.30) (DeVoe et al 2009). Children in families where no parents were insured were no less likely to have a dental visit in the past two years than children in families where at least

one parent was insured (OR 1.0, 95% CI 0.7 to 1.5) (Guendelman et al 2006). DeVoe and colleagues assessed whether children had been unable to get a needed prescription medication and found children with an uninsured primary parent did not differ from children with an insured primary parent (OR 0.89, 95% CI 0.64-1.22) (DeVoe et al 2008). This sample for this study was limited to low-income children in Oregon.

Unmet Medical Need

Both examinations by DeVoe and colleagues found a link between parental coverage and children's unmet medical need as reported by parents (DeVoe et al 2009, DeVoe et al 2008). In one study, children with an uninsured primary parent were more likely to have an unmet medical need than children whose primary parent was insured (OR 1.48, 95% CI 1.04-2.12) (DeVoe et al 2008). In the other study, children in the *no parents insured* group were more likely to have an unmet medical need than children in the *all parents insured* group (OR 1.11, 95% CI 1.01-1.22) (DeVoe et al 2009). Examinations by Guendelman and colleagues did not find this relationship (Guendelman and Pearl 2004, Guendelman et al 2006).

Significance

Ultimately, the conclusions that can be drawn about the relationship between parental health insurance for the primary parent and children's health care encounters are limited. Few studies exist. No relationship between parental coverage and emergency department visits, hospital admissions, dental visits, or prescription medications has been found. Parental coverage may not have an impact on these encounters, or gaps in coverage may have ameliorated the effect. Only one of these studies required children or parents to be insured the entire year in which the encounters were measured. There are

no studies of well-child visits in children from families with incomes above 200% FPL, and there is a discrepancy in the results between the two studies that examined these encounters. The lack of a strong relationship in one study may be attributable to gaps in parental coverage, or the relationship found in the second study may be due to unmeasured confounders. Only one of the eight studies that examined parental coverage and physician visits found a relationship, and it is unclear why. It is possible there is no link to this encounter, or the lack of relationship may be due to gaps in coverage. Furthermore, no assessment was made as to whether these visits were for recommended care.

The gaps left by these studies leave plenty of opportunity for study. This study will fill some of those gaps by examining the relationship between parental coverage and well-child visits in children of all incomes and require their parents to be insured the entire year in which visits are measured, which has not been done before. Additionally, it is the first study to examine recommended physician visits in children with asthma. Unlike most other studies of physician visits, it will include children of all incomes and require they and their parents be insured the entire year in which visits are assessed. Importantly, potential confounders excluded from previous studies will be included in both analyses. Social cognitive theory provides a comprehensive explanation for why parental insurance may impact children's encounters and will be used to select the variables included in the analyses.

Research Objectives

Objective 1: Estimate the effect of health insurance for the primary parent on insured children's well-child visits.

Null Hypothesis 1: Parental health insurance has no effect on insured children's well-child visits.

Alternate Hypothesis 1: Parental health insurance has a positive effect on insured children's well-child visits.

Objective 2: Estimate the effect of health insurance for the primary parent on physician visits for asthma in insured children.

Null Hypothesis 2: Parental health insurance has no effect on physician visits for asthma in insured children.

Alternate Hypothesis 2: Parental health insurance has a positive effect on physician visits for asthma in insured children.

CHAPTER III

METHODS

Design

The design of this study is a cross-sectional study of families participating in a national panel survey spanning two years. One year of data from a panel was used. Approval from the University of Iowa Institutional Review Board was obtained before initiating the study.

Data Source

The data for the study come from the Medical Expenditure Panel Survey-Household Component (MEPS-HC). MEPS-HC is a nationally representative survey of the U.S. civilian noninstitutionalized population. Households in MEPS-HC are selected from households that participated in the National Health Interview Survey. Households with Hispanic, black, and Asian residents are oversampled, as are low income households (Center for Financing, Access, and Cost Trends 2009b). Participating households compose a panel that is surveyed five times over a two and a half-year period to collect two years of data. The survey is a computer-assisted personal interview survey that is completed by a household member who provides information on all the members of the household.

MEPS-HC data from a given year includes data from the second year of one panel and data from the first year of the subsequent panel. Data for this study come from 2007, which includes the second year of data from Panel 11 and the first year of data from Panel 12.

MEPS-HC is a strong data source for this study because it links parents to their children and assesses children's health care encounters, which are crucial to the study objectives. It also provides detailed information on the insurance status of parents and their children. Whether or not an individual lacked insurance at any time during the year is specified, as is the source of coverage for each month of the two-year panel.

Sample

The sample is composed of children who were insured during the entire survey year; infants born during the year had to be insured since birth. The objective of the study was to examine the impact of parental insurance on insured children, so children who were uninsured or insured for only part of the year were excluded. Including these children would have weakened the ability of the study to find a relationship between parental insurance and children's utilization because a child's insurance status is a critical factor in his utilization (DeVoe et al 2009, DeVoe et al 2008, Davidoff et al 2003). Not having insurance is such a barrier to utilization that parents' insurance status is unlikely to matter in that situation. As mentioned previously, no relationship was found between parental coverage and children's physician visits in studies where the children were not required to be insured the entire year in which encounters were measured.

Included children must have a primary parent who is either insured or uninsured during the entire survey year. A full year insured has been selected for comparison to a full year uninsured because this provides the greatest exposure to health insurance for the parent and provides the starkest contrast to lack of insurance. Insurance coverage may come from any source for parents or children so long as it provides coverage for physician and hospital services, which is what coverage must be to be included as

insurance in MEPS-HC. For example, an individual with coverage for cancer only would not be considered to be insured. The relationship between parental coverage and children's health care encounters is expected to persist regardless of source of coverage.

Children were required to have coverage from the same source(s) all year long to prevent changes in the child's source of coverage from altering the child's encounters. A change in source of coverage can mean changes in factors that might affect the child's encounters, such as the cost-sharing for the encounter. For example, if the child's source of coverage changes from employer-based to Medicaid, the family may go from having some cost-sharing for the child's encounters to having no cost-sharing. The MEPS-HC variables used for source of coverage include TRIEVyy, MCREVyy, MCDEVyy, OPAEVyy, OPBEVyy, PRVEVyy, POGJAyy-POGDEyy, PEGJAyy-PEGDEyy, PRSJAyy-PRSDEyy, PNGJAyy-PNGDEyy, PDKJAyy-PDKDEyy, POUJAyy-POUDEyy, TRIJAyyX-TRIDEyyX, MCRJAyyX-MCRDEyyX, MCDJAyyX-MCDDEyyX, OPAJAyy-OPADEyy, OPBJAyy-OPBDEyy, STAJAyy-STADEyy, PUBJAyyX-PUBDEyyX, and PRIJAyy-PRIDEyy. These variables indicate whether or not the child had that source of coverage anytime during the year and whether or not the child had that source of coverage during each month of the year. The source of coverage for parents was allowed to fluctuate because health insurance is proposed to influence the parent regardless of the source.

The insurance status for children and their parents for the year was determined using the MEPS-HC variable EVRUNAT. This variable indicates whether the child or parent was uninsured at any point during the year. If a child or parent was not uninsured at any time during the year, the child or parent was considered to be insured the entire

year. For a parent to be considered uninsured the entire year, the parent must have a value of 1 for the MEPS-HC variable UNINSyy, which indicates an individual was uninsured for the entire year.

Only children linked to at least one parent by MEPS-HC were included. This includes biological, step, and adoptive parents. Mothers were identified by using the MEPS-HC variables MOPID31x, MOPID42x, and MOPID53x. Fathers were identified using DAPID31x, DAPID42x, and DAPID53x. If the child lives only with another family member or foster parent, MEPS-HC does not link that person to the child, so that child was not included.

In single-parent households, that parent was considered the primary parent. However, if there was a round where that parent did not live in the household at any time during that round, that child was not included in the study because that meant someone else was responsible for the child during the parent's absence. In two-parent households, decisions had to be made about which parent was the primary parent because MEPS-HC does not indicate this. If the child's mother and father were living in the household during all three rounds of the year, then the mother was considered the primary parent. This is because mothers are typically responsible for their children's health care encounters, so when both parents are present, I assumed the mother would take this role (Wyn et al 2003). If the mother did not live in the household for one or more rounds, but the father was living in the household during all three rounds, the father was considered the primary parent. This is because the father was consistently present in the household and was the primary parent when the mother was absent. If neither parent lived in the household during all three rounds of the survey, the child was not included.

Included children were 17 years of age or younger on December 31st of the survey year. The American Academy of Pediatrics recommended at least annual well-child visits for these children in 2007 and still does today. The exception to this is seven- and nine-year-olds for whom a well-child visit was not recommended in 2007 but is now recommended. Parents may be less involved in the health care decisions of older children, but they may still play a role, particularly with regard to deciding if an encounter is needed, choosing a provider for that encounter, or paying for the encounter. This is especially true given these children are included in the MEPS-HC because they are still considered part of their parents' households. Eighteen-year-olds were not included in the sample because some of the measures used in the analyses were not collected for this age group.

The recommended sample size for multivariate probit models is at least 500 subjects (Long 1997). Because probit models were used in this study, a sample of at least 500 was desirable. It is also recommended to include at least 10 observations for every independent variable, but there were fewer than 50 variables in the analyses, so a sample size of at least 500 was targeted (Long 1997).

Measurement

All variables used in this study are based on data from the MEPS-HC data files. The study variables are described below and summarized in Tables 1 and 2. All variables in the MEPS-HC data files are based on self-reported responses to survey items. Information provided by respondents on medical expenditures and prescription utilization is supplemented by the MEPS Medical Provider Component (MEPS-MPC), which surveys respondents' medical providers.

Table 1. Variables Included in Models, Source Variables in MEPS-HC, and Justification for Inclusion of Variables

	Variable	Source	Justification
Dependent	Well-child visit	Outpatient Visit and Office-Based Medical Provider Visit files: VSTCTGRY, OBICD1X, OBICD2X, OBICD3X, OBICD4X	--
	At least one asthma-related physician visit	Outpatient Visit and Office-Based Medical Provider Visit files: VSTCTGRY, OBICD1X, OBICD2X, OBICD3X, OBICD4X, SEETLKPV	--
	At least two asthma-related physician visits	Outpatient Visit and Office-Based Medical Provider Visit files: VSTCTGRY, OBICD1X, OBICD2X, OBICD3X, OBICD4X, SEETLKPV	--
Independent	Parent's insurance status	EVRUNAT/UNINSyy	Primary variable of interest
Instrument	Parent's eligibility for health insurance	OFFER31X, SPOUID31, POVLEV07	Address endogeneity problem
Covariates	Child's source of coverage	TRIEVyy, MCREVyy, MCDEVyy, OPAEVyy, OPBEVyy, PRVEVyy, POGJAyy-POGDEyy, PEGJAyy-PEGDEyy, PRSJAyy-PRSDEyy, PNGJAyy-PNGDEyy, PDKJAyy-PDKDEyy, POUJAyy-POUDEyy, TRIJAyyX-TRIDEyyX, MCRJAyyX-MCRDEyyX, MCDJAyyX-MCDDEyyX, OPAJAyy-OPADEyy, OPBJAyy-OPBDEyy, STAJAyy-STADEyy, PUBJAyyX-PUBDEyyX, PRIJAyy-PRIDEyy	Past literature & SCT
	Child's age	AGEyyX	Past literature & SCT
	Child's health status	RTHLTH31	Past literature & SCT

Table 1. Continued

	Child's limitations	CHLIMI42, CHLIHB42	Past literature & SCT
	Child's race/ethnicity	HISPANX, RACEX	Past literature & SCT
	Residence in Metropolitan Statistical Area	MSA31	Past literature & SCT
	Region of residence	REGION31	Past literature & SCT
	Parent's sex	SEX	Past literature & SCT
	Number of parents	MOPID31x, MOPID42x, MOPID53x, DAPID31x, DAPID42x, DAPID53x	Past literature & SCT
	Number of children	Constructed	Past literature & SCT
	Parent's worry	WRHLTH42	SCT
	First-born child	Constructed	Past literature & SCT
	Family income	POVCATyy	Past literature & SCT
	Parent's education	HIDEG	Past literature & SCT
	Parent's language	LANGHM42, ENGHME42, ENGSPK42	Past literature & SCT
	Parent's employment	EMPST31, HOUR31	Past literature & SCT
	Parent's utilization	OBTOTVyy, OPTOTVyy	Past literature & SCT
	Parent's health	PCS42, MCS42	Past literature & SCT
	Parent's risk aversion	ADRISK42	SCT
	Parent's self-care expectation	ADOVER42	SCT

Dependent Variables

One dependent variable of interest is whether the child had at least one well-child visit during the year. All children three through seventeen years, with the exception of seven- and nine-year-olds, were recommended to have one well-child visit per year.

Table 2. Values for Variables Included in the Models

	Variable	Source
Dependent	Well-child visit	0 = no well-child visits during the year 1 = at least one well-child visit during the year
	At least one asthma-related physician visit	0 = no asthma-related visits during the year 1 = at least one asthma-related visit during the year
	At least two asthma-related physician visits	0 = less than two asthma-related visits during the year 1 = at least two asthma-related visits during the year
Independent	Parent's insurance status	0 = parent uninsured 1 = parent insured
Instrument	Parent's eligibility for health insurance	0 = parent not eligible for health insurance 1 = parent eligible for health insurance
Covariates	Child's source of coverage	Private coverage = 0 or 1 Medicaid = 0 or 1 Other public coverage = 0 or 1 Multiple sources of insurance = 0 or 1
	Child's age	Continuous
	Child's health status	Poor or fair = 0 or 1 Good = 0 or 1 Very good = 0 or 1 Excellent = 0 or 1
	Child's limitations	0 = child does not have limitations 1 = child has limitations
	Child's race/ethnicity	non-Hispanic Caucasian = 0 or 1 non-Hispanic African American = 0 or 1 non-Hispanic other = 0 or 1 Hispanic = 0 or 1
	Residence in Metropolitan Statistical Area	0 = does not live in MSA 1 = lives in MSA
	Region of residence	Northeast = 0 or 1 Midwest = 0 or 1 South = 0 or 1 West = 0 or 1
	Parent's sex	0 = male 1 = female
	Number of parents	0 = single parent 1 = two parents
	Number of children	Continuous
	Parent's worry	Parent doesn't worry more than other parents = 0 or 1

Table 2. Continued

		Parent worries more than other parents = 0 or 1 Parent doesn't know if worry more than other parents = 0 or 1
	Oldest child in household	0 = not oldest child in household 1 = oldest child in household
	Family income	Poor = 0 or 1 Near poor = 0 or 1 Low income = 0 or 1 Middle income = 0 or 1 High income = 0 or 1
	Parent's education	Less than high school diploma = 0 or 1 High school diploma = 0 or 1 Bachelor's degree = 0 or 1 Graduate degree = 0 or 1 Other degree = 0 or 1
	Parent's language	0 = not comfortable speaking English 1 = comfortable speaking English
	Parent's employment	Parent unemployed = 0 or 1 Parent employed part-time = 0 or 1 Parent employed full-time = 0 or 1
	Parent's health care utilization	Parent has no utilization = 0 or 1 Parent has low utilization = 0 or 1 Parent has moderate utilization = 0 or 1 Parent has high utilization = 0 or 1
	Parent's health	PCS-12 score (continuous) MCS-12 score (continuous)
	Parent's risk aversion	Risk-neutral = 0 or 1 Risk-averse = 0 or 1 Risk-loving = 0 or 1
	Parent's self-care expectation	Neutral = 0 or 1 Parent expects positive outcomes = 0 or 1 Parent expects negative outcomes = 0 or 1

Children younger than three years should have more frequent visits depending on their age, but this variable is intended to assess whether children are at least having an annual visit and yearly contact with a medical provider.

Rather than coming from the Household Component Full-Year Consolidated Data file, the following variable comes from the Household Component Event files. Well-

child visits were assessed using the variable VSTCTGRY and diagnosis codes from the Outpatient Visits (OP) event file and Office-Based Medical Provider Visits (MV) event file. This is a MEPS-HC variable that is generated from a survey question asking the respondent to indicate which category best describes the care that was received at that particular visit. If the value for VSTCTGRY = 9: well-child exam, = 1: general checkup, or = 6: immunizations or shots, that visit will be counted as a well-child visit (Selden 2006, Selden and Hudson 2006, Jingbo et al 2011). In addition to choosing the category that describes the care, a respondent may indicate up to four conditions which are related to a provider visit. Those conditions are coded by professional coders into ICD-9 codes, but only the first three digits of the ICD-9 codes are released in MEPS-HC (Center for Financing, Access, and Cost Trends 2009a). The conditions are recorded in MEPS-HC in the order they were reported by the respondent, not in order of importance or severity. A visit with an ICD-9 code of V20 (infant or child health check) or V70 (general medical examination) in any of the four condition fields was also considered a well-child visit (Cohen and Coco 2010, Galbraith et al 2010). This will detect visits for which a well-child exam was not the primary reason for a visit but well-child care was provided. If a child had one or more well-child visits during the year, that child was coded as having a well-child visit.

Assessment of Asthma

A second dependent variable of interest is analyzed in a subgroup of children with asthma. Because asthma-related physician visits are assessed over one year, it is desirable to identify children who were diagnosed with asthma prior to or early in the study year. Unfortunately, the date of diagnosis cannot be ascertained from MEPS-HC.

While it cannot be guaranteed that children have asthma for the entire study year, the selection method should ensure these children had asthma for at least part of the year. Children were classified as having asthma if they met one of two selection criteria, either (A) a medical provider indicated the child had asthma (MEPS-HC variable ASTHDX=1) and the child still had asthma during the last round of the study year (MEPS-HC variable ASSTIL53=1) or (B) the child had a medical event, missed school or work, spent the day in bed, or was bothered due to asthma during the study year (Center for Financing, Access, and Cost Trends 2009a, Kamble and Bharmal 2009, Roberts 2003, Baydar et al 2010, Joesch et al 2006, Chen and Escarc 2007). The second criterion was determined using the Household Component Medical Conditions file.

Among children who were identified as having asthma in the study year, two dependent variables were created to assess their asthma-related physician visits. All children with asthma are recommended to visit a physician for monitoring at least every six months. This is true even for children with mild or intermittent asthma (National Asthma Education and Prevention Program 1997, National Asthma Education and Prevention Program 2007). The first dependent variable was intended to capture whether a child at least had annual contact with a physician regarding his or her asthma. It is a dichotomous variable where 1 means the child had at least one asthma-related physician visit during the year and 0 means the child did not have any asthma-related physician visits. A dichotomous variable indicating one or more visits for asthma versus no visits has been used previously to measure physician visits (Kim et al 2009). The second dependent variable is also a dichotomous variable, but in this variable 1 indicates the child had two or more asthma-related visits during the year and 0 indicates fewer than

two visits. This variable was intended to assess whether the child's asthma visits reached the minimum recommended quantity.

To be considered a physician visit for asthma monitoring, visits may occur in physician offices or outpatient departments but not emergency departments or inpatient hospital stays. These visits are found in the Household Component Event files. A visit with an ICD-9 code of 493 (asthma) in any of the four condition fields was considered an asthma-related visit (Wang et al 2005, Barnett and Nurmagambetov 2011). The main purpose of the visit could not be an emergency (VSTCTGRY=3) because this indicates an urgent, unplanned appointment. The child also had to see the provider in person (SEETLKPV=1); the visit could not simply be a telephone consultation.

Primary Independent Variable

Parental insurance status was coded as 1 for a child whose primary parent is insured all year and coded as 0 for a child whose primary parent is uninsured all year.

Covariates

Fully specified models for well-child visits and asthma-related physician visits include measures of all the determinants proposed by SCT. MEP-HC assesses some of the barriers to visits but lacks direct assessments of the other determinants and remaining barriers. Where those measures are lacking, available variables that might represent the determinant were used. For example, there are no questions asking parents how confident they feel in their ability to determine when their children need a well-child or asthma-related physician visit, select a provider, make an appointment, and get to that appointment, but a parent's own utilization could capture self-efficacy. Table 3

illustrates which determinants each variable is proposed to represent. The following paragraphs describe each variable.

Parent's Health

A parent's health is a barrier to children's well-child and asthma-related physician visits when it is poor enough to limit the parent's activities. Newacheck and Halfon found the children of mothers in poorer health had fewer physician visits than the children of mothers in better health (Newacheck and Halfon 1986). Limitations or disabilities can be attributable to physical or mental health. The two measures of parental health that are used in this study are the Physical Component Summary-12 (PCS-12) and Mental Component Summary-12 (MCS-12) scores the parent receives from the Short-Form 12 Version 2 (SF-12v2), which is incorporated into MEPS-HC. The SF-12v2 collects information about general health at the time of the survey, physical activity limitations in a typical day, interferences with work, household, and social activities due to physical or mental limitations during the past four weeks, and mood during the past four weeks. Thus, the PCS-12 and MCS-12 capture limitations due to physical or mental health. If there is sufficient information to do so, these scores are imputed (Center for Financing, Access, and Cost Trends 2009b). Lower PCS-12 and MCS-12 scores indicate worse physical and mental health, respectively (Cheak-Zamora et al 2009). These data were collected during the second round of the year, so the scores reflect a parent's health at that time. If a parent's health changes during the year, this measure will not capture that change.

Table 3. Proposed Relationship Between Variables and Social Cognitive Theory

Variable	Determinant					
	Barriers/ facilitators	Behavioral capability	Self-efficacy	Goals	Outcome expectations	Outcome expectancies
Parent health	X					
Parent use	X	X	X	X	X	X
Parent employed	X					
Family income	X					
Residence in MSA	X					
Child source of coverage	X					
Number of children	X					
Parent language	X		X			
Parent risk aversion					X	
Parent worry					X	X
Parent education		X				
Oldest child					X	
Parent self-care expectation						X
Two-parent household					X	X
Child age	X				X	
Child race/ ethnicity					X	X
Child health	X				X	X
Region	X				X	X
Parent sex		X	X		X	X

Parent's Health Care Utilization

A parent's own utilization of health care encounters is driven by SCT determinants just as children's encounters are. The parent's barriers, behavioral capability, self-efficacy, goals, outcome expectations, and outcome expectancies for a given encounter determine whether the parent has that encounter. If parents in identical health differ on their utilization, this suggests differences between the parents on at least one of the determinants. For example, the parent with greater utilization may have more positive outcome expectations for medical care. Thus, a parent's utilization is a reflection of her SCT determinants. The determinants that drive a parent to receive health care encounters herself should be similar to the determinants driving her child's health care encounters. A perfect match is not expected, but there should be considerable overlap. In support of this, studies have found children are more likely to have a physician visit during the year if their primary parent also has a visit (Hanson 1998, Newacheck and Halfon 1986). Thus, after controlling for parental health, parents' utilization of services represents other barriers, behavioral capability, self-efficacy, goals, outcome expectations, and outcome expectancies for their children's health care encounters.

The measure of parent utilization is the total number of office-based medical provider visits and outpatient department visits the parent had during the year. This measure was created by first summing the MEPS-HC variables OBTOTVyy and OPTOTVyy. The summed total number of visits was categorized into four categories. One category included parents without any visits. Parents with at least one visit were

divided into tertiles designating low, moderate, and high use. Parent utilization has previously been measured in a similar way (Newacheck and Halfon 1986).

The remaining variables were included (1) to better capture the determinants specific to children's well-child visits and asthma-related physician visits and/or (2) to capture determinants that are not measured by parents' health care utilization. For example, parents' utilization, controlling for parents' health, may only be measuring self-efficacy. The purpose of using multiple measures of a determinant where possible was to reduce measurement error associated with using a single survey item (Ansolabehere et al 2008).

Parent's Employment

Parental employment is a barrier because it reduces the amount of time the parent has available to attend a well-child visit or asthma-related physician visit. Even if an employed parent has paid sick leave, it may still be harder to take the child than if the parent were not working. While several studies did not find a relationship between parental employment and physician visits for insured children, at least one study found children in families where at least one parent was employed were less likely to have a physician visit in the past year (DeVoe et al 2009, DeVoe et al 2008, Davidoff et al 2003). Furthermore, mothers reported in interviews that taking time off work was a barrier to well-child visits (Earle and Burman 1998). The MEPS-HC variable that indicates a person's employment status when interviewed during the early part of the year is EMPST31. Those who had a job at that time were classified as employed. Those who did not have a job at that time were classified as unemployed. Those who were employed were further classified as having full- or part-time employment based on hours worked

per week (MEPS-HC variable HOUR31). Those working at least 40 hours per week were labeled as having full-time employment. Those working fewer than 40 hours per week were labeled as having part-time employment.

Family Income

All else equal, families with greater incomes can purchase more health care encounters than those with lesser incomes. Family income may be low enough that it is a barrier. The impact of income on children's encounters has depended on the income levels studied. In studies that included higher income children, children from higher income families are more likely to have a physician visit than children from lower income families (DeVoe et al 2009, Hanson 1998). Adolescents 10-17 years from families with incomes below 400% FPL were less likely to have a well-child visit in the past year than those from families with incomes of at least 400% FPL (Irwin et al 2009). However, in studies limited to lower income children, those from higher earning families were no more likely to have a physician visit or well-child visit than those from lower earning families (DeVoe et al 2008, Davidoff et al 2003, Gifford et al 2005). The MEPS-HC variable POVCATyy groups the family income for the year in five categories: poor/negative (<100% FPL), near poor (100-124% FPL), low income (125-199% FPL), middle income (200-399% FPL), and high income (≥400% FPL). Those categorizations were kept. MEPS-HC does impute income when those data are missing (Center for Financing, Access, and Cost Trends 2009b).

Residence in Metropolitan Statistical Area

Studies have found children living outside a Metropolitan Statistical Area (MSA) are less likely to have a well-child visit than children living in a MSA (Davidoff et al

2003, Short and Lefkowitz 1992). A MSA is an area with an urban community of at least 50,000 residents (Population Division). Residents of these urban communities may have more options for transportation to health care encounters than those living outside a MSA. In a MSA, there may be multiple providers offering well-child visits, and between these providers there may be more convenient appointment times available. Lack of transportation and lack of availability of providers have been identified as barriers to well-child visits by mothers living in a rural area (Earle and Burman 1998). MEPS-HC does not ask parents if they lack transportation to well-child visits or if they have difficulty finding a provider, but residence outside a MSA may partially capture these barriers. Just as lack of transportation and lack of providers are barriers to well-child visits, they are also barriers to asthma-related physician visits, so residence outside a MSA was used in this model as well.

MEPS-HC includes the variable MSA31, which indicates whether a child lives in a Metropolitan Statistical Area (MSA31=1 if child lives in a Metropolitan Statistical Area, and MSA31=0 if child does not live in a Metropolitan Statistical Area). This variable was used as is.

Child's Source of Coverage

The amount that has to be paid for an encounter can be a barrier for some families (Earle and Burman 1998). Unfortunately, the out-of-pocket cost faced by families is only available in MEPS-HC for children who received an encounter. This amount is not recorded for children who do not receive an encounter. Thus, out-of-pocket cost cannot be assessed directly for all children in the study. Because out-of-pocket cost tends to vary with source of coverage, source of coverage is used to capture out-of-pocket cost.

For example, well-child visits and immunizations are covered at no cost for children in Medicaid and SCHIP, but on average, private plans use at least some cost-sharing for these services (CMS 2011, NCSL 2007, Rosenbaum and Markus 2006, Molinari et al 2007). Source of coverage seems more likely to capture the out-of-pocket cost for the child's encounters than any other variable, including parent's utilization controlling for parent health. The use of source of coverage is supported by Davidoff and colleagues who found a link between a child's source of coverage and physician and well-child visits (Davidoff et al 2003).

Children were originally categorized into one of six categories: private, Medicaid, Tricare, Medicare, other public, and multiple sources of insurance. Children with coverage through only one source were assigned to the appropriate category. Children with coverage through multiple sources, public or private, were assigned to the *multiple sources of insurance* category. The number of children in the Tricare, Medicare, and other public insurance categories totaled less than 100, so these three categories were combined into one category. These three are all public sources of coverage.

Number of Children

The number of children in a household has been shown to influence well-child and physician visits. A child from a household with multiple children is less likely to have these visits than an only child (Davidoff et al 2003, Gifford et al 2005, Hanson 1998). Because the likelihood of a visit goes down as the number of children goes up, more children does not represent greater behavioral capability. A better explanation is that more children mean greater barriers. Parents have a finite amount of time and income to devote to their children. These resources must be spread across the children in

the family, so the more children there are, the fewer resources there are for any given child (Powell and Steelman 1995). This means less time and income to devote to any one child's health care encounters. Thus, having multiple children in the household is a barrier to health care encounters. For this study, the number of children in the household under 19 years of age was tallied and entered into the model as a continuous variable because there is a linear relationship between the probability of a well-child visit and the number of children (Gifford et al 2005).

Parent's Language

Spanish-speaking Hispanics in the U.S. are less likely to receive certain preventive care encounters than English-speaking Hispanics (DuBard and Gizlice 2008). Children of parents born outside the U.S. are less likely to have a physician visit during the year than children of parents born in the U.S. (Davidoff et al 2003). A parent's lack of comfort with speaking English is a barrier to health care encounters and may also capture lack of self-efficacy for arranging such encounters. The MEPS-HC variables LANGHM42, ENGHME42, and ENGSPK42 were combined to indicate whether or not an individual was comfortable speaking English.

Parent's Risk Aversion

Each time a child has a health care encounter, there are multiple possible outcomes. The child may receive a clean bill of health and require no further services. However, if the provider detects a problem, additional services may be recommended, leading to additional costs. Because of this, not having the encounter can be perceived as risky, but having the encounter can also be perceived as risky (Lieu et al 2010). Risk averse individuals avoid risky behaviors (Lorian and Grisham 2011). It is not clear if

parents are more likely to perceive having or not having well-child visits as risky because this phenomenon has not been studied. This is true for asthma-related visits as well. Either way, risk aversion represents parents' outcome expectations. If encounters are risky, risk averse parents will expect negative outcomes from those encounters (Lorian and Grisham 2011). If not having encounters is risky, risk averse parents will expect positive outcomes from those encounters (i.e. reduction in risk). Risk averse individuals have shown to be more likely to obtain preventive care than risk seeking individuals, suggesting failure to obtain preventive encounters may be perceived as risky (Mechanic and Cleary 1980). Question SAQ Q40 asks adults to indicate their level of agreement with the statement "I'm more likely to take risks than the average person." The responses to this question are disagree strongly, disagree somewhat, uncertain, agree somewhat, or agree strongly. The parents who strongly disagree with the statement are the most risk averse, whereas those who strongly agree are the least risk averse. Children were grouped according to their parents' responses. Those whose parents disagreed somewhat, agreed somewhat, or were uncertain were grouped together because they did not have strong opinions. Children whose parents strongly disagreed or strongly agreed were left in their own category.

Parent's Degree of Worry

Janicke and colleagues found the number of physician visits a child had increased as maternal worry about child health increased (Janicke et al 2001). Mothers of children given antibiotics for otitis media who agreed they worried a lot about their children's health were also more likely to administer the antibiotic and keep the follow-up appointment (Becker et al 1972). This evidence suggests the more worried a mother is

about her child's health, the more likely that child is to receive health care encounters. A parent's worry may be capturing more positive outcome expectations for health care encounters or greater outcome expectancies. Parental worry and the specific encounters in this study have not been examined, so it is possible parental worry could reduce the likelihood of these encounters. If this is the case, then worry could represent more negative outcome expectations or lower outcome expectancies.

Parental worry was assessed with Question CS01_05: I worry more about (PERSON)'s health than other people worry about their children's health. The responses to this question are definitely true, mostly true, don't know, mostly false, and definitely false. Definitely true and mostly true were collapsed into one category to represent worriers, meaning those that worry more than other parents. Definitely false and mostly false were collapsed into one category to represent parents that worry less than other parents or worry the same amount. Those that responded they did not know were left in their own group because it is not clear what level of worry this response indicates. Three dummy variables representing true, false, and don't know were created to represent this variable. The parent who responds to the survey is the parent who answers this question. While this is expected to be the child's primary parent in most cases, there are some children for whom the nonprimary parent answers this question. If the nonprimary parent's worry is influenced by the primary parent's worry, this variable still captures the primary parent's worry.

Parent's Education

A parent must understand a certain encounter is recommended for her child in order for the child to receive it. MEPS-HC does not include an assessment of parents'

knowledge about health care encounters recommended for their children, but it does include the education level of the parents. Education is used to capture behavioral capability because the two are linked. An individual's education contributes to her health literacy, which affects her health-related knowledge or behavioral capability (von Wagner et al 2009). This means more educated parents should have greater behavioral capability than less educated parents. Indeed, studies indicate children are more likely to have physician and well-child visits when their parents have earned a high school or college degree than when they have not completed high school (DeVoe et al 2009, Davidoff et al 2003, Gifford et al 2005, Hanson 1998). The MEPS-HC variable HIDEG indicates the highest level of education a person has completed. Five categories were created: no degree, high school diploma/GED, bachelor's degree, graduate degree, and other degree. The *other degree* category includes those with an associate's degree.

Oldest Child in the Household

With the first born child, parents have no experience with children's health or health care encounters. Their expectations of children's health care encounters are not based on their own experiences. As they gain experience with the first born child, their expectations about the outcomes of their younger children's encounters may change (Tessler 1980). Their expectations for the outcomes of well-child visits and asthma-related physician visits for their younger children may be more positive or negative than the expectations for the first child. This influences what health care encounters parents seek for their younger children.

Existing evidence reveals first-born children are more likely to have well-child visits and physician visits than later-born children. Short and Lefkowitz found first born

children were more likely to have a well-child visit than children who were not the first born (Short and Lefkowitz 1992). Tessler also found earlier born children were more likely to have a well-child visit and more likely to have a physician visit than later born children (Tessler 1980). Horwitz and colleagues found the earlier a child's birth order, the more acute care visits that child had (Horwitz et al 1985). This suggests parents' expectations about the positive outcomes of these visits dwindle as they gain experience with them. MEPS-HC does not indicate whether a child is the first-born but does allow for the determination of the oldest child in the household, so this variable is used to capture parent's outcome expectations. All the children in the household were ranked according to age, and any child that was not the oldest was assigned a value of zero for this variable. The oldest child was assigned a value of one.

Parent's Self-Care Expectation

MEPS-HC Question SAQ Q41 asks adults whether they believe they can overcome illness without the help of a medical professional. The responses to this question are disagree strongly, disagree somewhat, uncertain, agree somewhat, or agree strongly. The relationship between this variable and children's health care encounters has not previously been assessed, so it is unclear if there is a relationship and what the direction of that relationship is. This question provides an assessment of parents' expectations of medical care. Parents who indicate they strongly disagree with the statement are indicating they have positive outcome expectations for medical care. Parents who strongly agree with the statement may not have positive outcome expectations for medical care or may expect negative outcomes. The outcome expectations of these parents likely spill over to the outcomes they expect from their

children's encounters. Parents who disagree or agree somewhat or are uncertain were combined into one group because these parents were expected to be moderate in their expectations. Parents who disagree or agree strongly remained in individual groups because their expectations are the most extreme.

Two-Parent Household

Number of parents generally has been found to influence whether a child has a physician visit but not whether a child has a well-child visit (DeVoe et al 2009, Davidoff et al 2003, Gifford et al 2005, Hanson 1998, Short and Lefkowitz 1992, Fairbrother et al 2005). After controlling for the child's health and income, children in two-parent families are still less likely to have any physician visit (DeVoe et al 2009, Davidoff et al 2003, Hanson 1998, Fairbrother et al 2005). This result is counterintuitive because the presence of two parents would seemingly make it easier for a child to have an encounter because one parent could take the child to the encounter while the other parent cares for the other children in the family. However, one possible explanation is single primary parents have more positive outcome expectations or greater outcome expectancies from encounters than married primary parents. A married parent who is considering taking her ill child to the doctor may discuss this with her spouse. Prior to the conversation, the mother may have felt a visit to the doctor was needed to cure the child and alleviate her anxieties about the child's health. If her spouse convinces her the child simply has a cold and there is nothing the doctor can do, her outcome expectations of the visit change. Her husband has relieved her anxiety, so there is little a physician visit can offer her. For a single parent, there is no spouse to alleviate her anxiety, so she perceives benefit from the visit.

The number of parents in the household was constructed from variables provided in MEPS-HC. If both parents lived in the household during all three rounds, the household was considered a two-parent household (Chen and Escarc 2007). If only one parent lived in the household during the three rounds, the household was considered a single-parent household. If only one parent consistently lived in the household during the three rounds and the other parent was absent for one or more of the rounds, the household was considered a single-parent household.

Child's Age

Age has been linked to children's encounters. Examinations of well-child visits have shown older children are less likely to have a well-child visit than younger children (Davidoff et al 2003, Gifford et al 2005). This pattern also holds true for physician visits (DeVoe et al 2009, DeVoe et al 2008, Davidoff et al 2003, Hanson 1998). The child's age on December 31 of the year in which encounters were measured was used. This age is calculated by MEPS-HC and is variable AGEyyX. MEPS-HC does impute age when those data are missing, but this occurred for only 28 participants in the entire pool of over 30,000 surveyed in 2007 (Center for Financing, Access, and Cost Trends 2009b). To verify that age should be entered into the model as a continuous variable, the probability of a well-child visit was plotted against a child's age. Because the relationship between these two variables was linear, age was kept in the model as a continuous variable. Age was entered into the asthma-related physician visit model as a continuous variable as well.

Older age may capture multiple SCT determinants. A parent's expectations of the outcomes of encounters may change as the child ages. An older child capable of making

decisions may express resistance toward an encounter that a younger child does not express. The parent of this older child may anticipate negative consequences if she forces the child to go to the encounter, such as an annoyed child. Whereas well-child visits for young children may relieve a parent's anxiety about whether her child is healthy and developing appropriately, the parent may not be as uncertain about this for her older children. That expectation of a positive outcome from a well-child visit may not be present for an older child. Immunizations children need to be eligible for school are provided at well-child visits, so once the child enters school, that facilitator of well-child visits is no longer applicable. Furthermore, in 2007, well-child visits were not part of the recommendations for seven- and nine-year-olds, so that facilitator does not exist for some children. Specific to asthma-related physician visits, parents may have more anxiety about their young children's breathing than that of their older children who can communicate with them.

Child's Race/Ethnicity

Hispanic children and African-American children have been shown to be more likely to have a well-child visit than Caucasian children (Gifford, Davidoff 2003). However, Caucasian children have been shown to be more likely to have a physician visit than children of other races/ethnicities (Davidoff 2003, Hanson, DeVoe 2009, DeVoe 2008). For well-child visits, Caucasian race may represent fewer positive outcomes expected from these visits or lower outcome expectancies. The opposite is true for physician visits. The MEPS-HC variable RACEX indicates a child's race, and the variable HISPANX indicates whether or not the child is Hispanic. MEPS-HC does impute race and ethnicity when these data are missing (Center for Financing, Access, and

Cost Trends 2009b). These variables were combined to create four dummy variables representing non-Hispanic Caucasian, non-Hispanic African American, non-Hispanic other, and Hispanic. This is the same categorization used by Davidoff and colleagues (Davidoff et al 2003).

Child's Health

Children in excellent health are less likely to have a physician visit than other children (DeVoe et al 2009). In children with asthma, those in good, very good, or excellent health have fewer office visits for asthma than children in poor health (Chen and Escarc 2007). A child's poor health reflects the child's need for physician visits. A physician may recommend a visit for a child in poor health that would not be recommended for a child in better health, so health captures facilitators. The outcome expectations and outcome expectancies may also differ between parents of sicker children and healthier children, so health represents these as well.

Children's activity limitations have not been shown to have an influence on whether they have a well-child visit, and children in excellent health are as likely as children in poor health to have a well-child visit (Davidoff et al 2003, Short and Lefkowitz 1992). Thus, poor health does not appear to affect well-child visits the same as physician visits. However, children in good health were found to be less likely to have a well-child visit than children in excellent health (Davidoff et al 2003, Short and Lefkowitz 1992). The outcome expectations or outcome expectancies of parents for well-child visits may differ depending on the child's health.

Two measures of health will be included in both models. The purpose of using a second measure is to capture the effects of health that may not be captured by a single

measure alone. One measure is limitation due to health, which will be measured with Question CS05: "Is (PERSON) limited or prevented in any way in (his/her) ability to do the things most children of the same age can do?" and Question CS05OV1: "Is this because of any medical, behavioral or other health condition?" These questions are asked during the second round in the middle of the year, but I assume children with a limitation in the middle of the year have a limitation throughout the year. Children were included in this study regardless of whether they had a limitation or not. Children who had a limitation due to a health condition were coded as 1, while other children were coded as 0.

The second measure is children's health status, which was measured with Question CE1: "In general, compared to other people of (PERSON)'s age, would you say that (PERSON)'s health is excellent, very good, good, fair, or poor? The response to this question from the first round of the year was used so the measurement of health status preceded utilization as much as possible. Dummy variables were originally created for each of the five responses, but the number of children in poor health was so small this category was combined with fair health.

Region of Residence

States vary in the income eligibility levels they use for parents in Medicaid, but the state in which a family lives is not included in MEPS-HC. Instead, MEPS-HC includes variable REGION31 that indicates the region of the U.S. in which the family lived during the first round, either Northeast, Midwest, South, or West. Children living in certain states and regions are more likely to receive well-child visits than children living in other states and regions (Davidoff et al 2003, Selden 2006). Children in the

Northeast are more likely than children in any other region to have a physician visit (DeVoe et al 2009, Hanson 1998). Living in the Northeast may represent the facilitator of availability of physicians, outcome expectations, or outcome expectancies.

Parent's Sex

Parent's sex has not been linked to physician visits and has not been studied in well-child visits (Davidoff et al 2003, Gifford et al 2005, Hanson 1998, Short and Lefkowitz 1992). However, females are more likely to use health care services and are more likely to receive preventive health care than males (Mechanic and Cleary 1980, Bertakis et al 2000). Healthy females of child-bearing age have encounters for cervical cancer screenings and pregnancies, whereas healthy males may not have any preventive encounters. Thus, being female may capture behavioral capability and self-efficacy. Females may also have different outcome expectations and expectancies for encounters. These likely spillover to influence the decisions parents make about their children's encounters. An individual's sex is available in MEPS-HC as the variable SEX, with male=1 and female=2.

Empirical Model to Test Hypotheses

Well-child visits are hypothesized to be a function of the following variables:

Well-child visits = f(parent's insurance status, child's source of coverage, child's age, child's health status, child's limitations, child's race/ethnicity, MSA, region, parent's sex, number of parents, number of children, parent's worry, first-born child, family income, parent's education, parent's language, parent's employment, parent's utilization, parent's health, parent's risk aversion, and parent's self-care expectation)

Asthma-related physician visits are a function of the same variables. Simple probit models are only appropriate to estimate the models if there are no endogenous variables. In both the well-child visit and asthma-related physician visit models, parental insurance is expected to be an endogenous variable, meaning there are variables predicting children's encounters that also predict parental insurance status. The variables suspected of determining both children's encounters and parental insurance status are parent's employment, parent's health, parent's health care utilization, parent's self-care expectation, and parent's risk aversion. The relationship between these variables and parental insurance is discussed in the following paragraph.

Parental employment influences whether a parent is insured because it opens access to employer-sponsored coverage. An unemployed parent would only have access to employer-sponsored coverage if her spouse or partner were employed and she were eligible for coverage through that employer. Without access to employer-sponsored coverage, the unemployed parent would have to find coverage through another source. Parental health can affect whether or not a parent is insured, but the direction of that effect depends on the parent. For a parent who is not offered employer-sponsored coverage, her health could prevent her from being covered by an individual policy. Under those conditions, poor health contributes to a parent being uninsured. If a parent's health deteriorates to the point she is disabled, she may become eligible for Medicare and/or Medicaid. In the scenario just described, poor health contributes to a parent being insured. Low-income adults under 65 who are moderately or severely disabled are nearly half as likely to be uninsured as those without a disability (Sommers 2006a). Among parents who are eligible for coverage, either public or private, those who are in poor

health are more likely to be insured than those who are in better health, all else equal, because those in poor health have or anticipate greater need for health care services (Allen et al 2010). Under those circumstances, poor health contributes to a parent being insured. The percentage of adults 25-61 years without disability or one of nine chronic conditions who were uninsured for an entire year was 16.4%, compared to 11.1% among those with a chronic condition (Pizer et al 2009). Parental utilization and parent self-care expectations contribute to a parent being insured in that if a parent uses or will use health care services, that parent is more likely to be insured than a parent who does not plan to use these services, all else equal. Parental risk aversion is also related to whether a parent has insurance coverage. The more risk averse an individual is, the more likely she is to have insurance coverage (Cutler et al 2008).

If parental insurance is indeed an endogenous variable, including the aforementioned variables in a simple probit model is not sufficient to deal with endogeneity. This is because the influence of these variables on children's encounters cannot be separated from their influence on parent's insurance status. Because of this, the error term in a simple probit model would still be correlated with parent's insurance status, resulting in biased estimates. The solution to address this endogeneity problem is to use an instrumental variable model (Gujarati 2003). In one equation of the model, parental insurance is regressed on the instrumental variable and the covariates, as shown below. In the second equation of the model, the selected children's encounter is regressed on parental insurance and the covariates.

Equation 1:

$$W = \alpha Z + \gamma X + \mu$$

Where W = parent's insurance status, Z = instrumental variable, X = covariates, and μ = error term

Equation 2:

$$Y = \delta W + \beta X + \varepsilon$$

Where Y = child's encounter, W = parent's insurance status, X = covariates, and ε = error term

The instrument used in the first equation must be related to whether or not a parent has health insurance but should not be related to a child's health care encounters. The instrument selected for this study is *parental eligibility for health insurance*. Parental eligibility for health insurance was measured as a dummy variable indicating whether or not the parent was eligible for health insurance coverage.

The instrument was created differently depending on whether eligibility for employer-sponsored coverage is available for the parent or his or her spouse. Parents who indicated their or their spouse's eligibility for employer-sponsored coverage had that information used as their instrument. A parent was considered eligible for coverage if the parent or spouse in the household was eligible for health insurance through his or her employer. This information was generated from the MEPS-HC variable OFFER31X, which indicates whether the individual was offered health insurance by the job held during the first round of the year. Eligibility for health insurance coverage is related to whether a parent is insured. Given that they are not covered by a spouse, most employees accept health insurance when it is offered through an employer, including low-income employees, and the majority of uninsured employees are not offered health insurance through their employers (Kaiser Commission on Medicaid and the Uninsured 2009b,

Claxton et al). However, whether a parent is eligible for health insurance through an employer should not affect whether the child has a health care encounter.

Parents that did not have information on eligibility for employer-sponsored coverage (either because they and their spouse were unemployed or they did not provide this information) had their instrument created based on eligibility for Medicaid. Eligibility for Medicaid varies from state to state and is dependent on income and assets. Income eligibility levels for non-working parents varied from 11% to 275% of the Federal Poverty Level (FPL) in 2007; the range for working parents was 20% to 409% FPL (Ross et al 2008). The FPL for a family of three was $17,170 in 2007 (Leavitt 2007). In 2001, 19 states did not use an asset test for parents (Dinan 2003). In 2009, 23 states no longer used an asset test (Dean et al 2009). In the states with the lowest asset thresholds, parents cannot have more than $1,000 in assets (Dinan 2003, Dean et al 2009). Liquid assets and automobiles are typically included in the asset test, but the family home is not (Dean et al 2009, Smith et al 2001).

MEPS-HC does not include a variable that indicates whether or not an individual is eligible for Medicaid. Eligibility for Medicaid had to be constructed, but there are limitations due to the variables available in MEPS-HC. First, the state of residence is not available, so the specific state eligibility requirements for a given parent cannot be determined. However, because region of residence is available, it is possible to assess eligibility in relation to the eligibility levels for the region. The lowest, median, average, and highest eligibility levels for each region were determined based on the eligibility levels for the states in that region. These levels vary depending on whether the parent is working or not. For example, the Northeast region is composed of New Hampshire,

Massachusetts, New Jersey, New York, Connecticut, Rhode Island, Vermont, Pennsylvania, and Maine. The state with the lowest eligibility level in the Northeast is New Hampshire. The eligibility level is 44% FPL for nonworking parents and 55% FPL for working parents. In the state with the highest eligibility level, Maine, the level is 200% FPL for nonworking parents and 206% FPL for working parents. The median eligibility level for nonworking parents in the nine states is 185% FPL, and the median level for working parents is 191% FPL. The average eligibility level for the Northeast is 157% FPL for nonworking parents and 161% for working parents. These levels were calculated for each region and are found in Table 4. Four potential instrumental variables were created by determining whether a parent with a given household income would be eligible or ineligible for Medicaid coverage according to the eligibility levels in her region under each scenario (low, median, average, and high). For example, a nonworking parent with a household income of 142% FPL living in New Jersey would be ineligible for the low instrument because her income exceeds 44% FPL. She would be eligible for the median, average, and high instruments because her income falls below 185% FPL, 157% FPL, and 200% FPL, respectively. This process was repeated for each parent in each region to construct four potential instrumental variables. The low and high instruments were considered because they provide estimates at the extremes of income eligibility. The average instrument was considered because it minimizes the differential between the eligibility level the parent actually faced and the constructed eligibility level. It was expected to yield a more accurate assessment of eligibility than the low or high instruments. The median instrument was considered as an alternative to the average instrument because it is more robust to outlying states.

Table 4. Income Eligibility Levels for Region in Terms of Federal Poverty Level

Region	Nonworking	Working
Northeast		
Low	44%	55%
Median	185%	191%
Average	157%	161%
High	200%	206%
Midwest		
Low	20%	34%
Median	73%	77%
Average	114%	126%
High	275%	275%
South		
Low	11%	20%
Median	30%	53%
Average	64%	78%
High	200%	207%
West		
Low	22%	42%
Median	100%	100%
Average	101%	128%
High	200%	409%

Assets were disregarded for the instruments because they are not provided in MEPS-HC. Asset levels only matter for those parents whose incomes are below the eligibility threshold. If income is above the threshold, the parent is not eligible regardless of assets. Ignoring assets is acceptable because approximately 2/5 of the states do not use an asset test for parents, and the level of assets among low-income families is low (Aratani and Chau 2010). Among families with children, the median level of liquid assets for those with incomes below 100% FPL in 2007 was $0; the median level of liquid assets for those with incomes of 100%-199% FPL was $300. Furthermore, asset tests have been ignored in previous studies (Lykens and Jargowsky 2002, Montgomery 2007).

Thus, the empirical model for well-child visits is as follows:

Equation 1:

$$\text{Parent's insurance status} = \alpha_0 + \alpha_1 \bullet \text{parental eligibility for health insurance} + \alpha_2 \bullet \text{child's source of coverage} + \alpha_3 \bullet \text{child's age} + \alpha_4 \bullet \text{child's health status} + \alpha_5 \bullet \text{child's limitations} + \alpha_6 \bullet \text{child's race/ethnicity} + \alpha_7 \bullet \text{MSA} + \alpha_8 \bullet \text{region} + \alpha_9 \bullet \text{parent's sex} + \alpha_{10} \bullet \text{number of parents} + \alpha_{11} \bullet \text{number of children} + \alpha_{12} \bullet \text{parent's worry} + \alpha_{13} \bullet \text{first-born child} + \alpha_{14} \bullet \text{family income} + \alpha_{15} \bullet \text{parent's education} + \alpha_{16} \bullet \text{parent's language} + \alpha_{17} \bullet \text{parent's employment} + \alpha_{18} \bullet \text{parent's utilization} + \alpha_{19} \bullet \text{parent's health} + \alpha_{20} \bullet \text{parent's risk aversion} + \alpha_{21} \bullet \text{parent's self-care expectation} + \mu$$

Equation 2:

$$\text{Well-child visits} = \beta_0 + \beta_1 \bullet \text{parent's insurance status} + \beta_2 \bullet \text{child's source of coverage} + \beta_3 \bullet \text{child's age} + \beta_4 \bullet \text{child's health status} + \beta_5 \bullet \text{child's limitations} + \beta_6 \bullet \text{child's race/ethnicity} + \beta_7 \bullet \text{MSA} + \beta_8 \bullet \text{region} + \beta_9 \bullet \text{parent's sex} + \beta_{10} \bullet \text{number of parents} + \beta_{11} \bullet \text{number of children} + \beta_{12} \bullet \text{parent's worry} + \beta_{13} \bullet \text{first-born child} + \beta_{14} \bullet \text{family income} + \beta_{15} \bullet \text{parent's education} + \beta_{16} \bullet \text{parent's language} + \beta_{17} \bullet \text{parent's employment} + \beta_{18} \bullet \text{parent's utilization} + \beta_{19} \bullet \text{parent's health} + \beta_{20} \bullet \text{parent's risk aversion} + \beta_{21} \bullet \text{parent's self-care expectation} + \varepsilon$$

The empirical model for asthma-related physician visits is identical to the model for well-child visits.

Data Analysis

Descriptive statistics were produced for the entire sample, as well as for the insured parent group and the uninsured parent group. Chi-square tests were used to compare the categorical variables between the two groups, and independent samples t-tests were used to compare the continuous variables. Correlations between the

independent and dependent variables were calculated. Sample selection and variable recoding were performed using SAS version 9.2. Statistical analyses were performed using Stata/IC version 10.1. The level of significance for all analyses is $\alpha=0.05$. Because MEPS-HC uses a complex sampling design that involves stratification, clustering, multiple stages of selection, and disproportionate sampling, person weights must be applied to produce accurate estimates from multivariate analyses (Machlin et al 2005). These weights are provided by MEPS-HC and were used in the multivariate analyses. Because of the complex sampling design, the standard errors are artificially low without adjustment, making it easier to reject the null hypothesis. Variables for the primary sampling units and strata used in sample selection are provided within the MEPS-HC data, and these variables were included in analyses to correct the standard errors, along with person weights (Machlin et al 2005). The Stata survey commands are designed to incorporate these variables into analyses and estimate variance using the Taylor series linearization method (Machlin et al 2005). Some of the children in the sample are siblings, and this clustering can decrease the standard errors. However, if the standard errors are adjusted based on primary sampling units and strata, as they are in this study, this is sufficient to account for clustering of siblings. Further adjustments at the family level do not make a practical difference (West 2010). When the survey commands are used in Stata, it is important to use the subpopulation option rather than simply sub-setting the sample (Sribney 2005, Sribney 2009). The subpopulation option incorporates all the observations into the standard error calculation. If sub-setting is used, there may be some strata or primary sampling units that do not contain any members from the sample.

Probit models that do not include an instrumental variable were run on Equation 2. In order for Equation 2 to be estimated without Equation 1, the error terms for both equations (ε and μ) must be independent of each other. If the equations are estimated separately and the error terms are not independent, the estimates from Equation 2 will be biased (Maddala 1983). When the error terms are independent, the covariance between the error terms (rho or ρ) equals zero. If rho does not equal zero, the error terms are related, and a bivariate probit model should be used to simultaneously estimate both equations. To calculate the joint probability of two related events (for example, well-child visit = 1 and parental insurance status = 1), a bivariate joint distribution of the error terms must be selected (Maddala and Lee 1976). For bivariate probit, the bivariate normal distribution is selected. Bivariate probit models were used to simultaneously estimate Equation 1 and Equation 2 in this study. A bivariate probit model is appropriate when there is a binary dependent variable and a binary endogenous regressor (Gu et al 2008). Bivariate probit analysis is supported by Stata, and because bivariate probit was used for the instrumental variable models, probit analysis was selected for the simple models rather than logit.

While parental insurance is expected to be an endogenous variable and bivariate probit models are expected to be necessary, it is important to determine if this is true. If parental insurance is not endogenous, the estimates from simple probit models may be used. The null hypothesis that is tested is whether the covariance between the error terms from Equations 1 and 2 equals zero ($\rho = 0$). If this hypothesis is rejected, the potentially endogenous variable is considered endogenous, and bivariate probit should be used. If the null hypothesis is retained, the potentially endogenous variable is not considered

endogenous, and a simple probit model is sufficient. The Likelihood-Ratio test can be used to test the null hypothesis that rho (ρ) equals zero (Monfardini and Radice 2008). This is done by comparing the log-likelihood of the two equations simultaneously to the combined sums of log-likelihoods when the equations are estimated separately. However, the Likelihood-Ratio test cannot be used with the survey commands in Stata because weighting means there is no longer a true likelihood (Sribney 2005). The Wald test is instead used to test the null hypothesis that rho (ρ) equals zero when person weights are used.

Instruments must meet two criteria. First, they must be correlated with the endogenous variable (Angrist et al 1996). Instruments that are weakly related to the endogenous variable produce biased estimates (Stock et al 2002). The Staiger & Stock weak instrument test was used to test the strength of the relationship between parental insurance and parental eligibility for health insurance (Staiger and Stock 1997). The null hypothesis for the test is that the instrument is weak, so it is desirable to reject the null. With a single endogenous regressor and single instrument, the rule of thumb is an F statistic of greater than 10 allows rejection of the null hypothesis (Stock et al 2002, Stock and Yogo 2005). Stock and Yogo provide an additional suggestion that the F statistic be greater than 16.38 to reject the null (Stock and Yogo 2005).

Second, instruments should be uncorrelated with the error term (ε) in Equation 2 (Angrist et al 1996). The Sargan overidentification test is used to test this in an overidentified model where the number of instruments is greater than the number of endogenous regressors (Sargan 1958). However, it is not possible to test whether an instrument is correlated with the error term in an exactly identified model with a single

instrument and a single endogenous regressor (Cameron and Trivedi 2005). The models for this study are exactly identified, so no test can be performed.

Both bivariate probit and probit are nonlinear models. This means the marginal effects predicted by the models are dependent on the levels of all the variables in the model. The marginal effects when the variables are at the mean are different from the marginal effects when even one variable is at a level other than the mean. This is not true of linear models; with linear models, the marginal effects are the same regardless of the levels of the other variables in the model. Linear probability models were run for comparison of marginal effects.

Multicollinearity is a concern in multivariate models. To examine this, correlations were calculated between the independent variables. Variance inflation factors based on the linear probability model were also calculated. When the variance inflation factor for a variable exceeded 10, the probit models were run again with that variable dropped to see if the results changed (Obrien 2007).

Parental insurance is proposed to directly and indirectly influence children's encounters; the indirect effect flows through parental health care utilization. For the parental insurance variable to capture both the direct and indirect effects of parental insurance, parental health care utilization would have to be left out of the models. However, it is undesirable to exclude parent health care utilization because it represents the determinants of children's encounters. The inclusion of parent utilization makes it more difficult to find a relationship between parental insurance and children's encounters. Without parent utilization included, any effect of parental insurance would be captured by the parental insurance variable. With parent utilization included, if the estimate for

parent insurance is not significant but the estimate for parent utilization is, it is possible parent insurance is having an indirect effect through parent utilization. If the result just described is found, the probit model will be rerun without the parent utilization variable to see if parental insurance becomes significant.

If a child did not have a positive person weight, that child was not included in the analyses because these weights are needed to produce accurate estimates and standard errors from MEPS-HC (Machlin et al 2005). That meant some children with complete data were excluded. To have a positive person weight, a person must be a noninsitutionalized civilian for part of the year, not join a sampled household from an eligible but unsampled household, and provide complete responses for the period when a noninstitutionalized civilian. For example, a child that joins a MEPS-HC household because her mother remarries would not have a positive person weight. If a child was missing data on any of the variables included in the analyses, that child was not included in the analyses. Probit models predicting well-child visits were run with these children included, but the variables on which they were missing were dropped.

All the previous studies of the impact of parental insurance on well-child visits have been performed in children from families with incomes below 200% FPL. For comparison, the probit model predicting well-child visits was run on the subsample of children from low-income families.

CHAPTER IV

RESULTS

Table 5 denotes the inclusion criteria for the sample of children included in the well-child visit analysis. The total number of children is 4715, exceeding the desired number of at least 500 children. Of the 4715 eligible children, 559 had asthma. Because the number of children with asthma exceeded the threshold value of 500, one year of data was adequate for the asthma-related physician visit analyses. The first section of results covers well-child visits, and the second section discusses asthma-related physician visits.

Table 5. Inclusion Criteria

Inclusion Criteria	N
Participants in 2007 MEPS-HC	30,964
Children aged 17yrs or less	8,965
Children insured all year long	7,186
Children with linkable parent	6,830
Children with parent who was insured or uninsured all year	6,184
Children with consistent coverage all year	5,569
Children with positive person weights	5,419
Children with data for all variables	4,715

Well-Child Visits

Descriptive Statistics

Table 6 provides the characteristics of the overall sample included in the well-child visit analysis. Over 82% of the children had an insured primary parent. The percentage of children who had a well-child visit during the year was 49.25%. The characteristics of the 854 children excluded from analysis due to a person weight of zero or missing data are found in Appendix A. The excluded children were younger, more likely to be insured through Medicaid, more likely to have parents without any physician

Table 6. Sample Characteristics, Unweighted (N=4715)

	Overall (N=4715)		
Variable	Mean	SD	Range
Child age (yrs)	8.90	4.91	0-17
Number of children	2.50	1.21	1-8
Parent physical health	51.86	8.50	8.44-68.15
Parent mental health	49.35	10.13	1.04-76.12
	N	**%**	
Parent insured	3897	82.65	
Child insurance			
Private	2536	53.79	
Medicaid	1948	41.31	
Other public	93	1.97	
Multiple sources	138	2.93	
Two-parent home	3308	70.16	
Oldest child	2001	42.44	
Parent use			
No visits	1152	24.43	
1-2 visits	1323	28.06	
3-6 visits	1179	25.01	
>6 visits	1061	22.50	
Child health			
Poor or fair	146	3.10	
Good	798	16.92	
Very good	1322	28.04	
Excellent	2449	51.94	
Child has limitation	208	4.41	
Child race/ethnicity			
Caucasian	2093	44.39	
African American	881	18.69	
Other	384	8.14	
Hispanic	1357	28.78	
Family income			
<100% FPL	1199	25.43	
100%-124% FPL	293	6.21	
125%-199% FPL	775	16.44	
200%-399% FPL	1346	28.55	
≥400% FPL	1102	23.37	
MSA	3996	84.75	
Region of residence			
Northeast	721	15.29	
Midwest	1021	21.65	
South	1650	34.99	
West	1323	28.06	

Table 6. Continued

Parent worry			
Not worried	2920	61.93	
Worried	1497	31.75	
Don't know	298	6.32	
Female parent	4611	97.79	
Parent education			
Less than high school	998	21.17	
High school	2113	44.81	
Bachelor's	827	17.54	
Graduate degree	356	7.55	
Other degree	421	8.93	
Comfort w/English	4175	88.55	
Parent employment			
Not working	1799	38.15	
Part time	1209	25.64	
Full time	1707	36.20	
Parent risk aversion			
Risk neutral	2458	52.13	
Risk averse	2048	43.44	
Risk loving	209	4.43	
Parent self-care			
Neutral	2489	52.79	
Positive	161	3.41	
Negative	2065	43.80	
Well-child visit	2322	49.25	

visits, more likely to be in excellent health, and more likely to live in the West.

Table 7 gives the characteristics of the children with insured and uninsured parents included in the well-child visit analysis. The majority of children with uninsured primary parents have their own coverage through Medicaid or SCHIP, whereas the majority of children with insured primary parents have their coverage through private plans. The percentage of children with insured primary parents who had a well-child visit during the year was 50.60%, compared to only 42.79% of children with uninsured primary parents ($p<.001$). A table of correlations between the independent and dependent variables is found in Appendix A. The correlation between parent insurance and well-

Table 7. Sample Characteristics by Parent Insurance Status, Unweighted (N=4715)

	Parent insured (N=3897)			Parent uninsured (N=818)		
Variable	Mean	SD	Range	Mean	SD	Range
Child age (yrs)[a]	9.06	4.91	0-17	8.15	4.87	0-17
Number of children[a]	2.44	1.20	1-8	2.76	1.19	1-7
Parent physical health	51.84	8.57	8.44-68.15	51.95	8.14	19.36-66.33
Parent mental health	49.45	10.18	1.04-76.12	48.87	9.89	8.24-66.46
	N	**%**		**N**	**%**	
Child insurance[a]						
Private	2502	64.20		34	4.16	
Medicaid	1197	30.72		751	91.81	
Other public	82	2.10		11	1.34	
Multiple sources	116	2.98		22	2.69	
Two-parent home[a]	2775	71.21		533	65.16	
Oldest child[a]	1710	43.88		291	35.57	
Parent use[a]						
No visits	741	19.01		411	50.24	
1-2 visits	1100	28.23		223	27.26	
3-6 visits	1078	27.66		101	12.35	
>6 visits	978	25.10		83	10.15	
Child health[a]						
Poor or fair	101	2.59		45	5.50	
Good	599	15.37		199	24.33	
Very good	1112	28.53		210	25.67	
Excellent	2085	53.50		364	44.50	
Child has limitation	169	4.34		39	4.77	
Child race/ethnicity[a]						
Caucasian	1907	48.94		186	22.74	
African American	743	19.07		138	16.87	
Other	350	8.98		34	4.16	
Hispanic	897	23.02		460	56.23	
Family income[a]						
<100% FPL	814	20.89		385	47.07	
100%-124% FPL	190	4.88		103	12.59	
125%-199% FPL	548	14.06		227	27.75	
200%-399% FPL	1247	32.00		99	12.10	
≥400% FPL	1098	28.18		4	0.49	
MSA[a]	3330	85.45		666	81.42	
Region of residence[a]						
Northeast	683	17.53		38	4.65	
Midwest	913	23.43		108	13.20	
South	1192	30.59		458	55.99	
West	1109	28.46		214	26.16	
Parent worry[a]						
Not worried	2534	65.02		386	47.19	

Table 7. Continued

Worried	1128	28.95		369	45.11	
Don't know	235	6.03		63	7.70	
Female parent	3806	97.66		805	98.41	
Parent education[a]						
Less than high school	641	16.45		357	43.64	
High school	1725	44.26		388	47.43	
Bachelor's	800	20.53		27	3.30	
Graduate degree	354	9.08		2	0.24	
Other degree	377	9.67		44	5.38	
Comfort w/English[a]	3656	93.82		519	63.45	
Parent employment[a]						
Not working	1356	34.80		443	54.16	
Part time	1014	26.02		195	23.84	
Full time	1527	39.18		180	22.00	
Parent risk aversion[a]						
Risk neutral	1965	50.42		493	60.27	
Risk averse	1778	45.62		270	33.01	
Risk loving	154	3.95		55	6.72	
Parent self-care[a]						
Neutral	2084	53.48		405	49.51	
Positive	121	3.10		40	4.89	
Negative	1692	43.42		373	45.60	
Well-child visit[a]	1972	50.60		350	42.79	

[a]$p<.05$ for chi-square test (categorical variables) or independent samples t-test (continuous variables) comparing parent insured to parent uninsured group

child visits was significant but not strong (r=.06). The strongest correlation between an independent variable and well-child visits was the correlation with age (r=-.22).

Multivariate Models

Table 8 details the coefficient estimates and marginal effects from the probit model predicting whether a child has a well-child visit. The F-statistic for the overall model fit was significant, meaning we reject the null hypothesis that all the coefficients in the model equal zero. The coefficient estimates that are significant at the prespecified level of significance of $\alpha=0.05$ are in bolded type. The effect of parental insurance on whether a child has a well-child visit was not significant. Other variables that did not

Table 8. Coefficients and Marginal Effects from Probit Model Predicting Well-Child Visit (N=4715)

Variable	b[a]	SE	p	Marginal effects
Parent insured	.017	.094	.854	.01
Child age (yrs)	**-.063**	**.005**	**<.001**	**-.03**
Number of children	-.052	.031	.101	-.02
Parent physical health score (PCS-12)	.004	.003	.199	.002
Parent mental health score (MCS-12)	.0007	.003	.804	.0003
Child insurance: private[b]	-.069	.091	.447	-.03
Child insurance: other public[b]	-.192	.198	.333	-.08
Child insurance: multiple sources[b]	.096	.196	.625	.04
Two-parent home	-.014	.077	.851	-.01
Oldest child	**.123**	**.046**	**.007**	**.05**
Parent use: 1-2 visits[c]	**.245**	**.085**	**.004**	**.10**
Parent use: 3-6 visits[c]	**.392**	**.090**	**<.001**	**.16**
Parent use: >6 visits[c]	**.413**	**.089**	**<.001**	**.16**
Child health: good[d]	-.058	.147	.695	-.02
Child health: very good[d]	-.121	.136	.374	-.05
Child health: excellent[d]	-.145	.132	.273	-.06
Child has limitation	.141	.107	.189	.06
Child race: African American[e]	-.080	.088	.362	-.03
Child race: other[e]	-.028	.095	.767	-.01
Child race: Hispanic[e]	-.012	.093	.895	-.01
Family income: 100%-124% FPL[f]	.121	.137	.374	.05
Family income: 125%-199% FPL[f]	-.005	.107	.965	-.002
Family income: 200%-399% FPL[f]	.077	.120	.519	.03
Family income: ≥400% FPL[f]	**.317**	**.141**	**.026**	**.13**
Metropolitan Statistical Area	**.270**	**.086**	**.002**	**.11**
Region: Midwest[g]	**-.283**	**.098**	**.004**	**-.11**
Region: South[g]	**-.366**	**.091**	**<.001**	**-.15**
Region: West[g]	**-.515**	**.100**	**<.001**	**-.21**
Parent worry: worried[h]	.096	.065	.140	.04
Parent worry: don't know[h]	-.026	.115	.822	-.01
Female parent	**.460**	**.166**	**.006**	**.18**
Parent education: high school[i]	-.015	.095	.878	-.01
Parent education: bachelor's degree[i]	.109	.114	.341	.04
Parent education: graduate degree[i]	.263	.134	.051	.10
Parent education: other degree[i]	.034	.122	.780	.01
Comfort w/English	.200	.124	.106	.08
Parent employment: part time[j]	**-.188**	**.077**	**.015**	**-.07**
Parent employment: full time[j]	-.120	.076	.118	-.05
Parent risk aversion: risk neutral[k]	.030	.062	.626	.01
Parent risk aversion: risk loving[k]	-.165	.158	.296	-.07
Parent self-care expectation: neutral[l]	.041	.062	.507	.02

Table 8. Continued

Parent self-care expectation: positive[l]	-.141	.185	.446	-.06
Constant	-.185	.351	.599	

Model fit: F(42, 379)=6.82, p<.001

[a]Coefficients from probit model predicting well-child visit: no visit=0, visit=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

have a significant impact were number of children, parent score on the Physical Component Summary-12, parent score on the Mental Component Summary-12, child source of coverage, number of parents, child health status, child activity limitations, child race/ethnicity, parent worry about child's health, parent education, parent comfort with English, parent risk aversion, and parent self-care expectation. The variables that had a significant impact on well-child visits will now be discussed. The marginal effects reported assume all variables are held at the mean. With each year the child aged, the likelihood of having a well-child visit decreased. The predicted probability that a child

would have a well-child visit decreased by three percentage points for every one year increase in age. Being the oldest child in the household made it more likely a child would receive a well-child visit. The predicted probability that the oldest child in the household will have a well-child visit is five percentage points higher than the predicted probability that other children will have such a visit.

Parent's utilization impacted whether a child had a well-child visit. Children were more likely to have a well-child visit if their parents had at least one physician visit themselves. Compared to children whose parents had no physician visits, the predicted probability that children whose parents had one to two physician visits would have a well-child visit was ten percentage points higher. The predicted probability children whose parents had three or more physician visits during the year would have a well-child visit was sixteen percentage points higher than the predicted probability among children whose parents had no visits. The results of the probit analysis without the parent health care utilization variable are found in Appendix A. The results were similar to the original analysis, though children whose parents had earned a graduate degree became significantly more likely to have a well-child visit than children whose parents had not completed high school.

Family income was significant only when comparing children in families earning less than 100% FPL to those earning 400% FPL or more. The predicted probability among children in these high-income households was 13 percentage points higher than the predicted probability among children in households below the Federal Poverty Level. Having a female primary parent increased the likelihood a child would have a well-child visit. The predicted probability that children with a female primary

parent would have a well-child visit was 18 percentage points higher than the predicted probability a child with a male primary parent would have such a visit.

Children residing in a Metropolitan Statistical Area (MSA) were more likely to have a well-child visit. Living in a MSA increased the predicted probability by 11 percentage points. The region of the country in which the child lived influenced whether the child had a well-child visit. Children residing in the Northeast were more likely than children in any other part of the nation to have a well-child visit. The predicted probabilities for those in the Midwest, South, and West were 11, 15 and 21 percentage points lower, respectively.

Compared to children whose primary parents were not employed, children whose parents were employed part-time were seven percentage points less likely to have a well-child visit. There was no significant difference between children whose primary parents were not employed and those whose primary parents worked full-time.

The results of the probit analyses that include children excluded due to missing data and the analysis that includes only children from low-income families are found in Appendix A. When the 452 children who were only missing data on parent health, parent risk aversion, or parent self care expectation were included, the results were nearly identical to the results for the original sample of 4715 children. With the inclusion of the additional children, the estimates for a graduate degree and working full time became significant. When all 5419 children with a positive person weight were included, the results mirrored those from the original sample. Parent utilization, region, and parent employment were predictors in the original sample and the sample of 2267 low-income children, though the patterns differ. Unlike the original sample, being the oldest child,

living in a MSA, and having a female parent did not matter in low-income children, but parent education did.

Table 9 details the coefficient estimates/marginal effects from the linear probability model predicting whether a child has a well-child visit. The F-statistic for the overall model fit was significant, meaning we reject the null hypothesis that all the coefficients in the model equal zero. The R-squared for the model was 0.135, indicating the model predicts just over 13% of the variation in well-child visits. The marginal effects from the linear probability model are the same for all levels of covariates, not just at their means. Table 10 provides the marginal effects from the probit and linear probability models for easy comparison. The marginal effects from the two models are similar.

The variance inflation factors (VIFs) from the linear probability model are found in Appendix A. The VIFs for child's health status raised concern about multicollinearity because they approached or exceeded the rule of thumb of 10. The VIFs for excellent, very good, and good health were 11.89, 9.92, and 6.26, respectively. The most logical variable that would be correlated with a child's health status was whether the child had an activity limitation due to his health. The relationship between these two variables was assessed in two ways. First, the correlation coefficient was examined, but the magnitude was less than 0.15. Second, the probit model was repeated without the child's health status, but the results did not change. The results of this probit analysis are included in Appendix A. The small correlation coefficient and the similarity in results between the two probit models relieved concern about multicollinearity with the child's health status, and no further action was taken. The correlation coefficients between all the independent

Table 9. Coefficients from Linear Probability Model Predicting Well-Child Visit (N=4715)

Variable	b[a]	SE	p
Parent insured	.01	.034	.789
Child age (yrs)	**-.02**	**.002**	**<.001**
Number of children	-.02	.011	.104
Parent physical health score (PCS-12)	.002	.001	.200
Parent mental health score (MCS-12)	.0003	.001	.755
Child insurance: private[b]	-.03	.033	.441
Child insurance: other public[b]	-.07	.070	.300
Child insurance: multiple sources[b]	.03	.070	.699
Two-parent home	-.01	.028	.796
Oldest child	**.04**	**.016**	**.008**
Parent use: 1-2 visits[c]	**.09**	**.031**	**.004**
Parent use: 3-6 visits[c]	**.14**	**.032**	**<.001**
Parent use: >6 visits[c]	**.15**	**.032**	**<.001**
Child health: good[d]	-.02	.052	.690
Child health: very good[d]	-.04	.048	.366
Child health: excellent[d]	-.05	.046	.269
Child has limitation	.05	.038	.212
Child race: African American[e]	-.03	.032	.352
Child race: other[e]	-.01	.034	.772
Child race: Hispanic[e]	-.01	.033	.855
Family income: 100%-124% FPL[f]	.04	.049	.385
Family income: 125%-199% FPL[f]	-.003	.039	.934
Family income: 200%-399% FPL[f]	.03	.043	.540
Family income: ≥400% FPL[f]	**.11**	**.051**	**.029**
Metropolitan Statistical Area	**.10**	**.030**	**.001**
Region: Midwest[g]	**-.10**	**.034**	**.003**
Region: South[g]	**-.13**	**.031**	**<.001**
Region: West[g]	**-.18**	**.034**	**<.001**
Parent worry: worried[h]	.03	.023	.135
Parent worry: don't know[h]	-.01	.040	.835
Female parent	**.17**	**.057**	**.004**
Parent education: high school[i]	-.01	.034	.831
Parent education: bachelor's degree[i]	.04	.041	.343
Parent education: graduate degree[i]	.09	.047	.055
Parent education: other degree[i]	.01	.044	.809
Comfort w/English	.07	.044	.107
Parent employment: part time[j]	**-.07**	**.027**	**.016**
Parent employment: full time[j]	-.04	.026	.112
Parent risk aversion: risk neutral[k]	.01	.022	.625
Parent risk aversion: risk loving[k]	-.06	.056	.285
Parent self-care expectation: neutral[l]	.01	.022	.527
Parent self-care expectation: positive[l]	-.04	.065	.496

Table 9. Continued

Constant	**.37**	**.132**	**.005**

Model fit: F(42, 379)=10.36, p<.001; R-squared=0.135

[a]Coefficients from linear probability model predicting well-child visit: no visit=0, visit=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

variables were examined to check for multicollinearity between other variables. A table of these correlation coefficients is found in Appendix A. The largest correlation found was 0.58 for the relationship between family income less than 100% FPL and a child's Medicaid status. This is a logical relationship and does not raise concern about multicollinearity, so no further action was taken.

The instrumental variable used for each child depended on whether eligibility for employer coverage for either the parent or the parent's spouse was known. If eligibility for employer coverage was known, that was used as the instrument, and this was the case

Table 10. Comparison of Marginal Effects of Probit Model and Linear Probability Model Predicting Well-Child Visit (N=4715)

	Probit	Linear probability model
Parent insured	.01	.01
Child age (yrs)	**-.03**	**-.02**
Number of children	-.02	-.02
Parent physical health score (PCS-12)	.002	.002
Parent mental health score (MCS-12)	.0003	.0003
Child insurance: private[b]	-.03	-.03
Child insurance: other public[b]	-.08	-.07
Child insurance: multiple sources[b]	.04	.03
Two-parent home	-.01	-.01
Oldest child	**.05**	**.04**
Parent use: 1-2 visits[c]	**.10**	**.09**
Parent use: 3-6 visits[c]	**.16**	**.14**
Parent use: >6 visits[c]	**.16**	**.15**
Child health: good[d]	-.02	-.02
Child health: very good[d]	-.05	-.04
Child health: excellent[d]	-.06	-.05
Child has limitation	.06	.05
Child race: African American[e]	-.03	-.03
Child race: other[e]	-.01	-.01
Child race: Hispanic[e]	-.01	-.01
Family income: 100%-124% FPL[f]	.05	.04
Family income: 125%-199% FPL[f]	-.002	-.003
Family income: 200%-399% FPL[f]	.03	.03
Family income: ≥400% FPL[f]	**.13**	**.11**
Metropolitan Statistical Area	**.11**	**.10**
Region: Midwest[g]	**-.11**	**-.10**
Region: South[g]	**-.15**	**-.13**
Region: West[g]	**-.21**	**-.18**
Parent worry: worried[h]	.04	.03
Parent worry: don't know[h]	-.01	-.01
Female parent	**.18**	**.17**
Parent education: high school[i]	-.01	-.01
Parent education: bachelor's degree[i]	.04	.04
Parent education: graduate degree[i]	.10	.09
Parent education: other degree[i]	.01	.01
Comfort w/English	.08	.07
Parent employment: part time[j]	**-.07**	**-.07**
Parent employment: full time[j]	-.05	-.04
Parent risk aversion: risk neutral[k]	.01	.01
Parent risk aversion: risk loving[k]	-.07	-.06

Table 10. Continued

Parent self-care expectation: neutral[l]	.02	.01
Parent self-care expectation: positive[l]	-.06	-.04

[a]Coefficients from linear probability model predicting well-child visit: no visit=0, visit=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

for 3,722 children. When these 3,722 children were analyzed, the first-stage F statistic was 34.98 ($p<.001$), exceeding the rule of thumb of 10 and the more conservative critical value of 16.38 (Stock et al 2002, Stock and Yogo 2005). This allowed the rejection of the null hypothesis that eligibility for employer coverage was a weak instrument, meaning it was strong enough to use. To analyze the full sample, one of the four potential instruments had to be selected for the 993 children for whom eligibility for employer coverage was not known. The Staiger-Stock weak instrument tests for the full sample with each of the potential instruments are found in Table 11. The average

Table 11. Instrumental Variables Specification Tests for Well-Child Visit (N=4715)

Instrument	Rho (ρ)	Staiger-Stock Weak Instrument Test
Low	ρ=.320 (95% CI: -.001 to .580)	F statistic=47.66, p<.001
Median	ρ=.316 (95% CI: .012 to .567)	F statistic=52.90, p<.001
Average	**ρ=.218 (95% CI: -.094 to .490)**	**F statistic=54.43, p<.001**
High	ρ=.150 (95% CI: -.165 to .437)	F statistic=40.99, p<.001

instrument was chosen for this study, and the justification for the selection is provided in the next paragraph. With the additional 993 children, the first-stage F statistic grew to 54.43, meaning the average instrument is strong enough to use for the full sample. Rho was significantly different from zero for the full sample (Table 11) and for the subgroup of 3,722 children (ρ=.015, 95% CI -.357 to .383), indicating that parental insurance is not endogenous. This meant the simple probit model reported earlier could be used. For completeness, the results from the bivariate probit analyses with each instrument are included in Appendix A. The bivariate probit results are similar to the probit results, though children whose parents were comfortable speaking English were significantly more likely to have a well-child visit than the children whose parents were not comfortable with English in the bivariate probits.

The average instrument was chosen over the other potential instruments based on the first-stage F statistics for the subgroup of 993 children whose parents had unknown employer eligibility (Table 12). It was the only instrument with a significant F statistic. The first-stage equation for this subgroup differed slightly from the first-stage equation for the full sample because all the parents who had earned a graduate degree were insured. To remedy this, the category for a graduate degree was combined with the category for a bachelor's degree.

Table 12. Instrumental Variables Specification Tests for Well-Child Visit for Children Whose Parents were not Working or Did Not Have Known Eligibility for Employer Coverage (N=993)

Instrument	First-stage F statistic
Low	F statistic=.11, p=.742
Median	F statistic=2.08, p=.150
Average	F statistic=6.33, p=.012
High	F statistic=1.29, p=.257

Asthma-Related Physician Visits

Descriptive Statistics

Table 13 provides the characteristics of the overall sample included in the asthma-related physician visit analysis. Over 84% of children with asthma had an insured primary parent. The percentage of children with asthma who had at least one asthma-related physician visit during the year was 30.05%; the percentage of children who had at least two asthma-related physician visits was 14.85%.

Table 14 gives the characteristics of the children with insured and uninsured parents included in the asthma-related physician visit analyses. The majority of children with uninsured primary parents have their own coverage through Medicaid or SCHIP, whereas a slight majority of children with insured primary parents have their coverage through private plans. The percentage of children with insured primary parents who had at least one asthma-related physician visit during the year was 29.57%, compared to 32.58% of children with uninsured primary parents (p=.57). The percentage of children with insured primary parents who had at least two asthma-related physician visits during the year was 14.89%, compared to 14.61% of children with uninsured primary parents (p=.94). A table of correlations between the independent and dependent variables is found in Appendix B. Parent insurance was not significantly correlated with having at

Table 13. Sample Characteristics for Asthma Sample, Unweighted

	Overall (N=559)		
Variable	Mean	SD	Range
Child age (yrs)	9.11	4.46	0-17
Number of children	2.57	1.27	1-7
Parent physical health	50.01	9.44	15.78-66.35
Parent mental health	48.27	10.89	15.73-70.04
	N	%	
Parent insured	470	84.08	
Child insurance			
Private	261	46.69	
Medicaid	276	49.37	
Other public	6	1.07	
Multiple sources	16	2.86	
Two-parent home	335	59.93	
Oldest child	235	42.04	
Parent use			
No visits	124	22.18	
1-2 visits	144	25.76	
3-6 visits	152	27.19	
>6 visits	139	24.87	
Child health			
Poor or fair	50	8.94	
Good	159	28.44	
Very good	178	31.84	
Excellent	172	30.77	
Child has limitation	62	11.09	
Child race/ethnicity			
Caucasian	215	38.46	
African American	150	26.83	
Other	47	8.41	
Hispanic	147	26.30	
Family income			
<100% FPL	177	31.66	
100%-124% FPL	35	6.26	
125%-199% FPL	97	17.35	
200%-399% FPL	146	26.12	
≥400% FPL	104	18.60	
MSA	472	84.44	
Region of residence			
Northeast	86	15.38	
Midwest	117	20.93	
South	224	40.07	
West	132	23.61	

Table 13. Continued

Parent worry			
Not worried	281	50.27	
Worried	240	42.93	
Don't know	38	6.80	
Female parent	548	98.03	
Parent education			
Less than high school	103	18.43	
High school	270	48.30	
Bachelor's	75	13.42	
Graduate degree	42	7.51	
Other degree	69	12.34	
Comfort w/English	517	92.49	
Parent employment			
Not working	213	38.10	
Part time	151	27.01	
Full time	195	34.88	
Parent risk aversion			
Risk neutral	274	49.02	
Risk averse	254	45.44	
Risk loving	31	5.55	
Parent self-care			
Neutral	285	50.98	
Positive	16	2.86	
Negative	258	46.15	
At least one asthma-related physician visit	168	30.05	
At least two asthma-related physician visits	83	14.85	

least one or at least two asthma visits. The child having poor or fair health, the child having an activity limitation, and the parent having earned a bachelor's degree had the strongest correlations (r=.18) with having at least one asthma visit. The child having poor or fair health and the child having an activity limitation also had the strongest correlations (r=.19) with having at least two asthma visits.

Table 14. Sample Characteristics for Asthma Sample by Parent Insurance Status, Unweighted (N=559)

	Parent insured (N=470)			Parent uninsured (N=89)		
Variable	Mean	SD	Range	Mean	SD	Range
Child age (yrs)	9.13	4.47	0-17	8.99	4.45	1-17
Number of children	2.55	1.29	1-7	2.69	1.21	1-6
Parent physical health	50.07	9.52	15.78-66.35	49.73	9.07	26.31-65.40
Parent mental health	48.32	11.00	15.73-70.04	48.05	10.32	18.09-63.57
	N	**%**		**N**	**%**	
Child insurance[a]						
Private	257	54.68		4	4.49	
Medicaid	192	40.85		84	94.38	
Other public	6	1.28		0	0	
Multiple sources	15	3.19		1	1.12	
Two-parent home[a]	293	62.34		42	47.19	
Oldest child	203	43.19		32	35.96	
Parent use[a]						
No visits	78	16.60		46	51.69	
1-2 visits	123	26.17		21	23.60	
3-6 visits	137	29.15		15	16.85	
>6 visits	132	28.09		7	7.87	
Child health[a]						
Poor or fair	36	7.66		14	15.73	
Good	134	28.51		25	28.09	
Very good	157	33.40		21	23.60	
Excellent	143	30.43		29	32.58	
Child has limitation	50	10.64		12	13.48	
Child race/ethnicity[a]						
Caucasian	193	41.06		22	24.72	
African American	123	26.17		27	30.34	
Other	43	9.15		4	4.49	
Hispanic	111	23.62		36	40.45	
Family income[a]						
<100% FPL	135	28.72		42	47.19	
100%-124% FPL	23	4.89		12	13.48	
125%-199% FPL	73	15.53		24	26.97	
200%-399% FPL	136	28.94		10	11.24	
≥400% FPL	103	21.91		1	1.12	
MSA	403	85.74		69	77.53	
Region of residence[a]						
Northeast	82	17.45		4	4.49	
Midwest	105	22.34		12	13.48	
South	170	36.17		54	60.67	
West	113	24.04		19	21.35	
Parent worry[a]						

Table 14. Continued

Not worried	247	52.55		34	38.20	
Worried	195	41.49		45	50.56	
Don't know	28	5.96		10	11.24	
Female parent	460	97.87		88	98.88	
Parent education[a]						
Less than high school	85	18.09		18	20.22	
High school	210	44.68		60	67.42	
Bachelor's	73	15.53		2	2.25	
Graduate degree	40	8.51		2	2.25	
Other degree	62	13.19		7	7.87	
Comfort w/English[a]	450	95.74		67	75.28	
Parent employment						
Not working	178	37.87		35	39.33	
Part time	125	26.60		26	29.21	
Full time	167	35.53		28	31.46	
Parent risk aversion						
Risk neutral	229	48.72		45	50.56	
Risk averse	219	46.60		35	39.33	
Risk loving	22	4.68		9	10.11	
Parent self-care[a]						
Neutral	229	48.72		56	62.92	
Positive	13	2.77		3	3.37	
Negative	228	48.51		30	33.71	
At least one asthma-related physician visit	139	29.57		29	32.58	
At least two asthma-related physician visits	70	14.89		13	14.61	

[a]$p<.05$ for chi-square test (categorical variables) or independent samples t-test (continuous variables) comparing parent insured to parent uninsured group

Multivariate Models: At Least One Asthma-Related Physician Visit

Table 15 details the coefficient estimates and marginal effects from the probit model predicting whether a child has an asthma-related physician visit. None of the eleven children with a male parent had an asthma-related visit. This problem is known as separation and can be resolved by dropping the offending variable, so parent sex was dropped (Zorn 2005). Separation also occurs for this sample in the first-stage equation

Table 15. Coefficients and Marginal Effects from Probit Model Predicting Whether Child had at Least One Asthma-Related Physician Visit (N=559)

Variable	b[a]	SE	p	Marginal effects
Parent insured	-.327	.256	.201	-.10
Child age (yrs)	**-.045**	**.018**	**.010**	**-.01**
Number of children	-.026	.068	.702	-.01
Parent physical health score (PCS-12)	-.010	.009	.267	-.003
Parent mental health score (MCS-12)	.007	.007	.313	.002
Child insurance: private[b]	-.002	.249	.994	-.001
Child insurance: multiple sources[b]	-.485	.429	.260	-.15
Two-parent home	.371	.201	.066	.11
Oldest child	-.008	.157	.957	-.003
Parent use: 1-2 visits[c]	-.236	.246	.338	-.07
Parent use: 3-6 visits[c]	.242	.229	.291	.07
Parent use: >6 visits[c]	-.085	.240	.725	-.03
Child health: good[d]	-.282	.268	.293	-.09
Child health: very good[d]	**-.753**	**.275**	**.007**	**-.23**
Child health: excellent[d]	**-.699**	**.280**	**.013**	**-.21**
Child has limitation	.319	.235	.176	.10
Child race: African American[e]	-.211	.217	.332	-.06
Child race: other[e]	-.237	.263	.369	-.07
Child race: Hispanic[e]	.058	.227	.798	.02
Family income: 100%-124% FPL[f]	-.610	.346	.079	-.19
Family income: 125%-199% FPL[f]	-.141	.232	.547	-.04
Family income: 200%-399% FPL[f]	-.114	.258	.660	-.03
Family income: ≥400% FPL[f]	-.082	.305	.789	-.02
Metropolitan Statistical Area	.032	.212	.881	.01
Region: Midwest[g]	-.324	.222	.146	-.10
Region: South[g]	**-.409**	**.202**	**.044**	**-.12**
Region: West[g]	**-.847**	**.213**	**<.001**	**-.26**
Parent worry: worried[h]	.248	.159	.121	.08
Parent worry: don't know[h]	**.586**	**.238**	**.014**	**.18**
Parent education: high school[i]	.227	.265	.392	.07
Parent education: bachelor's degree[i]	**1.008**	**.329**	**.002**	**.31**
Parent education: graduate degree[i]	.647	.351	.066	.20
Parent education: other degree[i]	.371	.318	.244	.11
Comfort w/English	-.005	.355	.988	-.002
Parent employment: part time[j]	-.045	.185	.810	-.01
Parent employment: full time[j]	**-.486**	**.189**	**.011**	**-.15**
Parent risk aversion: risk neutral[k]	.015	.158	.924	.005
Parent risk aversion: risk loving[k]	-.305	.398	.444	-.09
Parent self-care expectation: neutral[l]	.044	.169	.797	.01
Parent self-care expectation: positive[l]	.909	.473	.056	.28
Constant	.768	.827	.354	

Table 15. Continued
Model fit: F(40, 246)=2.49, p<.001

[a]Coefficients from probit model predicting whether child has at least one asthma-related physician visit: no visits=0, at least one visit=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

predicting parent's insurance status. Six children have public coverage other than Medicaid or SCHIP, and all of them have insured parents. These children, all of whom have Tricare, were combined with the Medicaid/SCHIP children. Like Medicaid/SCHIP, Tricare covers visits for asthma; whether or not there is cost-sharing and the amount of that cost-sharing depends on the specific Tricare program (DoD 2011). For consistency, the two categories were combined for the probit as well as bivariate probit analyses. The results of the probit analysis without the parent health care utilization variable are found in Appendix B. The results were similar to the original analysis, though children in the

South were no longer significantly less likely to have an asthma visit than children in the Northeast. Children in families earning 100%-124% of the FPL became significantly less likely have an asthma visit than children in families earning <100% of the FPL.

Table 16 details the coefficient estimates/marginal effects from the linear probability model predicting whether a child with asthma has at least one asthma-related physician visit. The F-statistic for the overall model fit was significant, meaning we reject the null hypothesis that all the coefficients in the model equal zero. The R-squared for the model was 0.199, indicating the model explains just under 20% of the variation in whether a child with asthma has an asthma-related physician visit. Table 17 compares the marginal effects from the probit and linear probability models; they were similar

The VIFs from the linear probability model are found in Appendix B. All the VIFs are less than the rule of thumb of ten. This indicates multicollinearity is not a problem. As an additional check, the correlation coefficients between all the independent variables were examined. A table of these correlation coefficients is found in Appendix B. The largest correlation found was 0.57 for the relationship between family income less than 100% FPL and a child's Medicaid status. This is a logical relationship and does not raise concern about multicollinearity, so no further action was taken.

Table 18 shows that for the full sample of 559 children with asthma, the first-stage F statistics exceed the rule of thumb of 10 for all the potential instruments and exceed the conservative critical value of 16.38 for the average and high instruments. The first-stage F statistics for the subgroup of 159 children with asthma whose parents had unknown parental eligibility for health insurance did not aid in selecting an instrument because none of the F statistics were significant (Table 19). To generate the F statistics

Table 16. Coefficients from Linear Probability Model Predicting Whether Child had at Least One Asthma-Related Physician Visit (N=559)

Variable	b[a]	SE	p
Parent insured	-.09	.077	.250
Child age (yrs)	**-.01**	**.005**	**.008**
Number of children	-.01	.020	.777
Parent physical health score (PCS-12)	-.003	.003	.224
Parent mental health score (MCS-12)	.002	.002	.404
Child insurance: private[b]	.01	.069	.908
Child insurance: multiple sources[b]	-.16	.117	.165
Two-parent home	.10	.058	.082
Oldest child	.005	.047	.916
Parent use: 1-2 visits[c]	-.07	.070	.294
Parent use: 3-6 visits[c]	.07	.068	.308
Parent use: >6 visits[c]	-.04	.070	.599
Child health: good[d]	-.10	.090	.250
Child health: very good[d]	**-.24**	**.090**	**.009**
Child health: excellent[d]	**-.22**	**.091**	**.015**
Child has limitation	.10	.080	.216
Child race: African American[e]	-.06	.062	.323
Child race: other[e]	-.09	.072	.212
Child race: Hispanic[e]	.01	.065	.833
Family income: 100%-124% FPL[f]	-.17	.092	.059
Family income: 125%-199% FPL[f]	-.04	.068	.587
Family income: 200%-399% FPL[f]	-.03	.075	.665
Family income: ≥400% FPL[f]	-.02	.086	.860
Metropolitan Statistical Area	.01	.063	.875
Region: Midwest[g]	-.11	.071	.131
Region: South[g]	**-.13**	**.065**	**.049**
Region: West[g]	**-.24**	**.061**	**<.001**
Parent worry: worried[h]	.07	.049	.135
Parent worry: don't know[h]	**.18**	**.079**	**.021**
Parent education: high school[i]	.06	.072	.386
Parent education: bachelor's degree[i]	**.30**	**.095**	**.002**
Parent education: graduate degree[i]	**.20**	**.100**	**.047**
Parent education: other degree[i]	.11	.086	.207
Comfort w/English	-.02	.096	.844
Parent employment: part time[j]	-.02	.057	.779
Parent employment: full time[j]	**-.14**	**.057**	**.014**
Parent risk aversion: risk neutral[k]	.01	.047	.835
Parent risk aversion: risk loving[k]	-.09	.122	.481
Parent self-care expectation: neutral[l]	.01	.050	.864
Parent self-care expectation: positive[l]	.28	.144	.054
Constant	**.77**	**.247**	**.002**

Table 16. Continued
Model fit: F(40, 246)=3.92, p<.001; R-squared=0.199

[a]Coefficients from linear probability model predicting whether child has at least one asthma-related physician visit: no visits=0, at least one visit=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

for the smaller sample, the variables with multiple categories were collapsed to single dummy variables. Regardless of whether the average or high instruments are used for the full sample of 559 children, rho is not significantly different from zero (Table 18). Parental insurance is not endogenous, and the simple probit model can be used. For completeness, the results of each bivariate probit are included in Appendix B. The bivariate probit results are similar to the probit results, though children in the South were no longer significantly less likely to have an asthma visit than children in the Northeast in

Table 17. Comparison of Marginal Effects of Probit Model and Linear Probability Model Predicting Whether a Child had at Least One Asthma-Related Physician Visit (N=559)

	Probit[a]	Linear probability model[aa]
Parent insured	-.10	-.09
Child age (yrs)	**-.01**	**-.01**
Number of children	-.01	-.01
Parent physical health score (PCS-12)	-.003	-.003
Parent mental health score (MCS-12)	.002	.002
Child insurance: private[b]	-.001	.01
Child insurance: multiple sources[b]	-.15	-.16
Two-parent home	.11	.10
Oldest child	-.003	.005
Parent use: 1-2 visits[c]	-.07	-.07
Parent use: 3-6 visits[c]	.07	.07
Parent use: >6 visits[c]	-.03	-.04
Child health: good[d]	-.09	-.10
Child health: very good[d]	**-.23**	**-.24**
Child health: excellent[d]	**-.21**	**-.22**
Child has limitation	.10	.10
Child race: African American[e]	-.06	-.06
Child race: other[e]	-.07	-.09
Child race: Hispanic[e]	.02	.01
Family income: 100%-124% FPL[f]	-.19	-.17
Family income: 125%-199% FPL[f]	-.04	-.04
Family income: 200%-399% FPL[f]	-.03	-.03
Family income: ≥400% FPL[f]	-.02	-.02
Metropolitan Statistical Area	.01	.01
Region: Midwest[g]	-.10	-.11
Region: South[g]	**-.12**	**-.13**
Region: West[g]	**-.26**	**-.24**
Parent worry: worried[h]	.08	.07
Parent worry: don't know[h]	**.18**	**.18**
Parent education: high school[i]	.07	.06
Parent education: bachelor's degree[i]	**.31**	**.30**
Parent education: graduate degree[i]	.20	**.20**
Parent education: other degree[i]	.11	.11
Comfort w/English	-.002	-.02
Parent employment: part time[j]	-.01	-.02
Parent employment: full time[j]	**-.15**	**-.14**
Parent risk aversion: risk neutral[k]	.005	.01
Parent risk aversion: risk loving[k]	-.09	-.09
Parent self-care expectation: neutral[l]	.01	.01

Table 17. Continued

Parent self-care expectation: positive[l]	.28	.28

[a]Marginal effects from probit model predicting whether child has at least one asthma-related physician visit: no visits=0, at least one visit=1

[aa]Marginal effects from linear probability model predicting whether child has at least one asthma-related physician visit: no visits=0, at least one visit=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

Table 18. Instrumental Variables Specification Tests for at Least One Asthma-Related Physician Visit (N=559)

Instrument	Rho (ρ)	Staiger-Stock Weak Instrument Test
Low	ρ=-.524 (95% CI: -.918 to .392)	F statistic=10.31, p=.002
Median	ρ=-.472 (95% CI: -.895 to .399)	F statistic=13.31, p<.001
Average	**ρ=-.442 (95% CI: -.893 to .452)**	**F statistic=18.41, p<.001**
High	**ρ=-.404 (95% CI: -.842 to .356)**	**F statistic=21.26, p<.001**

the bivariate probits. Children whose parents had earned a graduate degree became significantly more likely to have an asthma visit than children whose parents had not completed high school.

Table 19. Instrumental Variables Specification Tests for at Least One Asthma-Related Physician Visit for Children Whose Parents were Not Working or Did Not have Known Eligibility for Employer Coverage (N=159)

Instrument	First-stage F statistics
Low	F statistic=1.62, p=.206
Median	F statistic=.48, p=.491
Average	F statistic=.59, p=.444
High	F statistic=.72, p=.397

Unlike the first-stage F statistic in the bivariate probit for well-child visits for the subgroup of children whose parents had known eligibility for health insurance, the F statistic (7.93, p=.005) in the synonymous group of 400 children with asthma does not exceed the rule of thumb of 10 and the more conservative critical value of 16.38 (Stock et al 2002, Stock and Yogo 2005). This finding indicates the estimates from a bivariate probit in this subgroup of children with eligibility for employer coverage as the instrument could potentially be biased. Only estimates from bivariate probits with the full sample of 559 children should be used because the instrument is strong enough for this group. For completeness, the rho for the subgroup of 400 children is -.282 (95% CI -.838 to .561).

Multivariate Models: At Least Two Asthma-Related Physician Visits

Table 20 details the coefficient estimates and marginal effects from the probit model predicting whether a child has at least two asthma-related physician visits. As

Table 20. Coefficients and Marginal Effects from Probit Model Predicting Whether Child had at Least Two Asthma-Related Physician Visits (N=559)

Variable	b[a]	SE	p	Marginal effects
Parent insured	-.340	.271	.211	-.05
Child age (yrs)	-.028	.019	.138	-.004
Number of children	-.085	.081	.293	-.01
Parent physical health score (PCS-12)	-.004	.011	.722	-.001
Parent mental health score (MCS-12)	.007	.009	.454	.001
Child insurance: private[b]	.103	.314	.744	.01
Child insurance: multiple sources[b]	-.443	.435	.309	-.06
Two-parent home	-.155	.241	.519	-.02
Oldest child	-.226	.175	.198	-.03
Parent use: 1-2 visits[c]	-.073	.275	.792	-.01
Parent use: 3-6 visits[c]	.073	.283	.798	.01
Parent use: >6 visits[c]	.292	.303	.335	.04
Child health: good[d]	**-.988**	**.323**	**.002**	**-.14**
Child health: very good[d]	**-1.060**	**.315**	**.001**	**-.15**
Child health: excellent[d]	**-1.274**	**.338**	**<.001**	**-.18**
Child has limitation	.431	.240	.073	.06
Child race: African American[e]	-.444	.275	.107	-.06
Child race: other[e]	.261	.267	.328	.04
Child race: Hispanic[e]	-.084	.252	.739	-.01
Family income: 100%-124% FPL[f]	-.272	.389	.486	-.04
Family income: 125%-199% FPL[f]	.164	.273	.549	.02
Family income: 200%-399% FPL[f]	.214	.318	.501	.03
Family income: ≥400% FPL[f]	.163	.390	.676	.02
Metropolitan Statistical Area	-.014	.250	.955	-.002
Region: Midwest[g]	**-.749**	**.255**	**.004**	**-.10**
Region: South[g]	**-.845**	**.235**	**<.001**	**-.12**
Region: West[g]	**-1.107**	**.224**	**<.001**	**-.15**
Parent worry: worried[h]	.160	.190	.400	.02
Parent worry: don't know[h]	.195	.319	.542	.03
Parent education: high school[i]	.514	.269	.058	.07
Parent education: bachelor's degree[i]	**1.169**	**.400**	**.004**	**.16**
Parent education: graduate degree[i]	**.984**	**.419**	**.020**	**.14**
Parent education: other degree[i]	**.806**	**.373**	**.032**	**.11**
Comfort w/English	-.096	.400	.810	-.01
Parent employment: part time[j]	-.227	.209	.277	-.03
Parent employment: full time[j]	**-.773**	**.208**	**<.001**	**-.11**
Parent risk aversion: risk neutral[k]	.111	.174	.523	.02
Parent risk aversion: risk loving[k]	-.975	.568	.087	-.14
Parent self-care expectation: neutral/positive[l]	-.278	.204	.175	-.04
Constant	.968	1.006	.337	

Model fit: F(39, 247)=2.55, p<.001

Table 20. Continued

[a]Coefficients from probit model predicting whether child has at least two asthma-related physician visits: less than two visits=0, at least two visits=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

with the analysis for at least one asthma-related visit, the parent sex variable was excluded, and children with public coverage other than Medicaid or SCHIP were combined with the Medicaid/SCHIP category. There was an additional separation problem for this dependent variable. None of the children whose parents indicated positive expectations for self-care had at least two physician visits, so the positive self-care expectation category was combined with the neutral self-care expectation category. This combination allowed those with negative self-care expectations to remain in their own category. The results of the probit analysis without the parent health care utilization variable are found in Appendix C. The results were similar to the original analysis except

children with an activity limitation became significantly more likely to have at least two asthma visits than children without a limitation.

Table 21 details the coefficient estimates/marginal effects from the linear probability model predicting whether a child with asthma has at least two asthma-related physician visits. The F-statistic for the overall model fit was significant, meaning we reject the null hypothesis that all the coefficients in the model equal zero. The R-squared for the model was 0.174, indicating the model explains just under 18% of the variation in whether a child with asthma has at least two asthma-related physician visits. Table 22 compares the marginal effects from the probit and linear probability models. The direction of the marginal effects was the same, but those from the linear probability model were generally larger.

The VIFs from the linear probability model are found in Appendix C. All the VIFs are less than the rule of thumb of ten. This indicates multicollinearity is not a problem. As an additional check, the correlation coefficients between all the independent variables were examined. A table of these correlation coefficients is found in Appendix B. The largest correlation coefficient found was 0.57 for the relationship between family income less than 100% FPL and a child's Medicaid status. This is a logical relationship and does not raise concern about multicollinearity, so no further action was taken.

Table 23 shows that for the full sample of 559 children with asthma, the first-stage F statistics exceed the rule of thumb of 10 for all the instruments and exceed the conservative critical value of 16.38 for the average and high instruments. The first-stage F statistics for the subgroup of 159 children whose parents had unknown eligibility for health insurance are the same as those presented for having at least one asthma-related

Table 21. Coefficients from Linear Probability Model Predicting Whether Child had at Least Two Asthma-Related Physician Visits (N=559)

Variable	b[a]	SE	p
Parent insured	-.06	.049	.210
Child age (yrs)	-.01	.004	.060
Number of children	-.01	.014	.327
Parent physical health score (PCS-12)	-.001	.002	.698
Parent mental health score (MCS-12)	.001	.002	.666
Child insurance: private[b]	.03	.060	.651
Child insurance: multiple sources[b]	-.09	.070	.203
Two-parent home	-.04	.041	.342
Oldest child	-.03	.036	.454
Parent use: 1-2 visits[c]	-.03	.048	.559
Parent use: 3-6 visits[c]	-.02	.053	.773
Parent use: >6 visits[c]	.03	.060	.661
Child health: good[d]	**-.25**	**.092**	**.008**
Child health: very good[d]	**-.26**	**.091**	**.005**
Child health: excellent[d]	**-.28**	**.094**	**.003**
Child has limitation	.11	.066	.098
Child race: African American[e]	-.07	.045	.131
Child race: other[e]	.03	.052	.543
Child race: Hispanic[e]	.003	.045	.946
Family income: 100%-124% FPL[f]	-.07	.066	.321
Family income: 125%-199% FPL[f]	.04	.048	.384
Family income: 200%-399% FPL[f]	.05	.059	.353
Family income: ≥400% FPL[f]	.04	.073	.567
Metropolitan Statistical Area	-.02	.050	.737
Region: Midwest[g]	**-.17**	**.064**	**.009**
Region: South[g]	**-.19**	**.062**	**.002**
Region: West[g]	**-.22**	**.057**	**<.001**
Parent worry: worried[h]	.01	.041	.763
Parent worry: don't know[h]	.03	.069	.706
Parent education: high school[i]	.07	.040	.082
Parent education: bachelor's degree[i]	**.20**	**.075**	**.007**
Parent education: graduate degree[i]	**.18**	**.075**	**.017**
Parent education: other degree[i]	**.14**	**.067**	**.039**
Comfort w/English	.01	.064	.878
Parent employment: part time[j]	-.05	.048	.296
Parent employment: full time[j]	**-.15**	**.045**	**.001**
Parent risk aversion: risk neutral[k]	.03	.037	.418
Parent risk aversion: risk loving[k]	-.12	.074	.096
Parent self-care expectation: neutral/positive[l]	-.06	.043	.143
Constant	**.70**	**.208**	**.001**

Table 21. Continued
Model fit: F(39, 247)=1.97, p=.001; R-squared=0.174

[a]Coefficients from linear probability model predicting whether child has at least two asthma-related physician visits: less than two visits=0, at least two visits=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: 1-2 visits

[d]Reference category: Child health: good

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: High school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

visit in Table 19 and were not useful for selecting an instrument. Regardless of whether the average or high instruments are used for the full sample of 559 children, rho is not significantly different from zero (Table 23). Parental insurance is not endogenous, and the simple probit model can be used. For completeness, the results of each bivariate probit analysis are included in Appendix C. The bivariate probit results are similar to the probit results, though children whose parents had earned a degree other than a bachelor's or graduate degree were no longer more likely to have at least two asthma visits than children whose parents had not completed high school. The first-stage F statistic for the

Table 22. Comparison of Marginal Effects of Probit Model and Linear Probability Model Predicting Whether a Child had at Least Two Asthma-Related Physician Visits (N=559)

	Probit[a]	Linear probability model[aa]
Parent insured	-.05	-.06
Child age (yrs)	-.004	-.01
Number of children	-.01	-.01
Parent physical health score (PCS-12)	-.001	-.001
Parent mental health score (MCS-12)	.001	.001
Child insurance: private[b]	.01	.03
Child insurance: multiple sources[b]	-.06	-.09
Two-parent home	-.02	-.04
Oldest child	-.03	-.03
Parent use: 1-2 visits[c]	-.01	-.03
Parent use: 3-6 visits[c]	.01	-.02
Parent use: >6 visits[c]	.04	.03
Child health: good[d]	**-.14**	**-.25**
Child health: very good[d]	**-.15**	**-.26**
Child health: excellent[d]	**-.18**	**-.28**
Child has limitation	.06	.11
Child race: African American[e]	-.06	-.07
Child race: other[e]	.04	.03
Child race: Hispanic[e]	-.01	.003
Family income: 100%-124% FPL[f]	-.04	-.07
Family income: 125%-199% FPL[f]	.02	.04
Family income: 200%-399% FPL[f]	.03	.05
Family income: ≥400% FPL[f]	.02	.04
Metropolitan Statistical Area	-.002	-.02
Region: Midwest[g]	**-.10**	**-.17**
Region: South[g]	**-.12**	**-.19**
Region: West[g]	**-.15**	**-.22**
Parent worry: worried[h]	.02	.01
Parent worry: don't know[h]	.03	.03
Parent education: high school[i]	.07	.07
Parent education: bachelor's degree[i]	**.16**	**.20**
Parent education: graduate degree[i]	**.14**	**.18**
Parent education: other degree[i]	**.11**	**.14**
Comfort w/English	-.01	.01
Parent employment: part time[j]	-.03	-.05
Parent employment: full time[j]	**-.11**	**-.15**
Parent risk aversion: risk neutral[k]	.02	.03
Parent risk aversion: risk loving[k]	-.14	-.12
Parent self-care expectation: neutral/positive[l]	-.04	-.06

Table 22. Continued
[a]Marginal effects from probit model predicting whether child has at least two asthma-related physician visits: less than two visits=0, at least two visits=1

[aa]Marginal effects from linear probability model predicting whether child has at least two asthma-related physician visits: less than two visits=0, at least two visits=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: 1-2 visits

[d]Reference category: Child health: good

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: High school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

Table 23. Instrumental Variables Specification Tests for at Least Two Asthma-Related Physician Visits (N=559)

Instrument	Rho (ρ)	Staiger-Stock Weak Instrument Test
Low	ρ=.183 (95% CI: -.448 to .693)	F statistic=10.56, p=.001
Median	ρ=.198 (95% CI: -.423 to .693)	F statistic=13.46, p<.001
Average	**ρ=.270 (95% CI: -.395 to .750)**	**F statistic=18.45, p<.001**
High	**ρ=.222 (95% CI: -.362 to .680)**	**F statistic=21.27, p<.001**

subgroup of 400 children whose parents had known eligibility for health insurance is the same as that presented for one asthma-related visit, and the conclusion remains the same. Only estimates from bivariate probits with the full sample of 559 children should be used.

A summary of hypothesis testing is found in Table 24.

Table 24. Summary of Hypothesis Testing

Objective	Null hypothesis	Alternative hypothesis	Decision
Estimate the effect of health insurance for the primary parent on insured children's well-child visits.	Parental health insurance has no effect on insured children's well-child visits.	Parental health insurance has a positive effect on insured children's well-child visits.	Retain null
Estimate the effect of health insurance for the primary parent on physician visits for asthma in insured children.	Parental health insurance has no effect on physician visits for asthma in insured children.	Parental health insurance has a positive effect on physician visits for asthma in insured children.	Retain null

CHAPTER V

DISCUSSION AND CONCLUSIONS

The first part of this section discusses the relationship between parental insurance and children's visits. The second part discusses the relationship between the other independent variables and children's visits. As I discuss my study findings in relation to previous studies, I will refer to my study as "this study". Parent insurance for an entire year did not have an effect on the likelihood of well-child or asthma-related physician visits during the year for insured children 17 years of age or younger, which is contrary to the proposed hypotheses. These results match the well-child results from Davidoff and colleagues (Davidoff et al 2003). In their study, children were grouped according to their parents' insurance status at the time of the survey. This meant the parents of children in the insured parents group could have been uninsured during the year the visits were measured, and the parents of children in the uninsured parents group could have been insured during the year. This minimized the differences between the groups and made it harder to reject the null. In this study, the insurance status of the parents over the entire year is known and the children of parents who were insured or uninsured for part of the year were excluded. This created the greatest contrast between groups in terms of parents' insurance status and still no difference was found. This study included higher-income children that were excluded from the Davidoff study, suggesting a lack of effect of parental insurance for all income groups.

The results disagree with the well-child results from Gifford and colleagues. In the Gifford study, insured children with insured parents were more likely to have a well-child visit than their counterparts with uninsured parents (Gifford et al 2005). The

exclusion of parents' health care utilization from the Gifford study does not explain the different conclusions (further explanation is given below in the discussion of an indirect effect of parental insurance). A potential explanation is the Gifford study included only a subset of children included in this study; the children in the Gifford study were young Medicaid enrollees. The results of this study do not rule out the possibility of an effect in that subgroup, though when children from families with incomes below 200% FPL were examined in this study, parental insurance still did not have an impact.

No studies have examined the impact of parental insurance on visits for asthma, so there is no comparison for the results of this study. The decision to model asthma-related physician visits as whether or not the child had a visit and whether or not the child had at least two visits was a change from the original design. The original design called for determining whether children had a gap between visits that exceeded the recommended six months. However, once the data were analyzed, it was discovered that only 30% of insured children had at least one asthma-related physician visit, and only 15% had at least two visits, which is the minimum recommended quantity. This revealed the importance of returning to the basics and understanding what factors contribute to a child with asthma even seeing his or her provider.

It was surprising that so few children had even one visit for their asthma. Care was taken to identify children with active asthma. The children included in the asthma analyses were selected because their parents indicated they had been diagnosed with asthma and still had asthma at the end of the study year or because they had been bothered by their asthma during the year. Even if the children had only mild asthma, the guidelines still recommend they be seen every six months (National Asthma Education

and Prevention Program 1997, National Asthma Education and Prevention Program 2007). Yet these results indicate most children are not even seen every 12 months. Chen and Escarce also found low rates of asthma visits among children; only 56% visited their provider during an 18-month period (Chen and Escarc 2007).

The failure to reject the null hypotheses indicates parent insurance does not have a direct, independent impact on children's likelihood of visits. It was proposed that parental insurance would lower the out-of-pocket medical expenditures for the parent, increasing the amount of income that was available to spend on other goods and services. Either out-of-pocket expenditures were not lower or if they were, insured parents did not choose to spend the available income on their children's visits.

This raises the question of whether parental insurance has an indirect impact on children's utilization through an influence on parents' utilization. To influence children's utilization, parental insurance has to increase parental utilization and subsequently change the determinants of children's visits. Because this is a cross-sectional study, it is impossible to know if parental utilization and the determinants changed due to parental insurance. Previous studies suggest use increases when individuals become insured (Kahn et al 2007, Freeman et al 2008, McWilliams et al 2003). In this study, parental utilization was higher in the insured group as theorized. Among children with insured parents, 25% had parents with high utilization (more than six provider visits during the year). Among children with uninsured parents, only 10% fell in this category. The proportion of children whose parents had no physician visits during the year was 19.01% in the insured parent group. In the uninsured parent group, the proportion of children whose parents had no physician visits during the year was 50.24%. These results are

comparable to the results of a 1999 survey where 57% of low-income uninsured parents did not have a physician visit during the year, but only 29% of parents covered by Medicaid did not see a physician (Dubay and Kenney 2001).

The association between parent utilization and parent insurance raises concern that parents with a proclivity to utilize health care services are the ones that choose to purchase insurance. However, a check of whether parental insurance is an endogenous variable reveals it is determined independently of utilization. An explanation for this is that parents participate in insurance when it is offered to them, either through an employer or Medicaid, regardless of their utilization. In 2007, approximately 80% of eligible employees participated in their employers' health insurance (Claxton et al). In 2008, approximately 80% of children eligible for Medicaid or CHIP participated (Kenney et al 2010). Current estimates of parent participation in public programs could not be found.

The conclusion in the previous paragraph that parental insurance is not endogenous warrants further discussion. This determination was made after retaining the null hypothesis that rho equals zero. The accurate testing of this null hypothesis hinges on the strength of the chosen instrument. An instrument that is only weakly related to the endogenous variable jeopardizes the integrity of instrumental variable analysis, making it difficult to trust the results of the test of endogeneity. While there are limitations to the instrument used in this study, it proved to be strong for the overall sample of 4715 and the sample of 559 children with asthma. This gives confidence in the conclusion parental insurance is not endogenous. The limitations of the instrument are discussed in the Limitations section.

Because parental insurance is not endogenous, the higher utilization of insured parents in this study could very well be attributable to their insurance, but this is not certain. Regardless, parental utilization predicted children's likelihood of visits in this study, leaving one to wonder if parental insurance has an effect on children's visits that is buried in the parental utilization variable. However, this was not the case because the regression coefficients for parental insurance did not change when the parental utilization variable was dropped; parental insurance was still not a significant predictor of visits. These findings reinforce the conclusion that parental insurance during a given year does not impact insured children's likelihood of well-child and asthma-related physician visits during that year.

The proposal of parental insurance as an intervention that could influence the determinants of children's visits seems plausible. Not all the determinants would be expected to change for a given child, but it was felt that at least one of them might. However, even if insured parents use more health care services because they are insured as proposed, one can come up with explanations for why that use might not necessarily affect the determinants that prevent a child from having a visit. Without a change in a determinant, children's visits will be unaffected. A parent can gain sufficient knowledge of what providers are available and how to make an appointment by taking the child for the child's visits; if a lack of knowledge about this process is not what is hindering the child's visit, a parent's increased proficiency with this process through her own visits will not affect the likelihood her child will have a visit. If a parent does not know that her child needs to continue well-child visits after she reaches school age, that child is not going to have any more well-child visits. An insured parent who sees her physician

several times during the year for acute infections could easily go through these encounters with being exposed to new information about well-child visits. A parent who has taken her older children for well-child visits and seen no positive outcomes because of them is not going to be swayed through her own visits to the doctor when she is ill. If a parent without asthma does not realize people with asthma should be seen by their physicians even when they are not having an asthma attack, it is reasonable she would not gain this information during her own encounters. These examples provide explanation for why parental insurance does not affect insured children's utilization of health care encounters.

These results do not support the conclusion that parental insurance never has an effect on insured children's visits. The possibility that parental insurance affects children's utilization when that insurance is first gained cannot be ruled out by this study. In this study, the utilization of children with insured parents was compared to the utilization of children with uninsured parents. However, the health insurance history of these parents is unknown. Presumably most uninsured parents have had insurance in the past. In a national survey spanning four years, only 12% of those who were uninsured at any time during that period were uninsured the entire time (Short and Graefe 2003). Even if these 12% never had insurance, they compose a minority of the population. This means most of the uninsured parents in this study had insurance at some point in the past. If parental insurance has an influence on the determinants of children's visits when it is first obtained and that influence does not subside when insurance is lost, then the uninsured parents are similar to the insured parents in terms of determinants for the study year. It is reasonable to believe changes that occur when first insured will stick after

insurance is lost. For example, a parent who previously did not go to the doctor but does when she becomes insured will gain some behavioral capability from that visit. If she loses her insurance, she can still maintain the same level of behavioral capability. If changes to self-efficacy, outcomes expectations, and outcome expectancies occur, the new levels are also maintained. Future studies need to identify uninsured parents with no history of insurance.

It is valuable to assess possible explanations for a lack of effect of parental insurance. One potential explanation is multicollinearity; if there is multicollinearity between parental insurance and another variable, this would prevent a relationship between parent insurance and children's visits from being detected. It would also prevent a relationship between the other variable and children's visits from being detected. An examination of privately insured children in the well-child and asthma visit analyses reveals over 98% had insured parents. Over 91% of children with uninsured parents had Medicaid. For the children in the well-child visit analysis, the correlation between private coverage for a child and parent insurance was 0.46, and the correlation between Medicaid for a child and parent insurance was -0.47. These numbers raise concern there may be multicollinearity between parent insurance and a child's source of coverage, but closer inspection alleviates this concern. The correlation coefficients between parent insurance and a child's source of coverage were some of the strongest in the study, but they fall short of the rules of thumb for multicollinearity of 0.75 to 0.9. Further, the highest variance inflation factor (VIF) associated with a child's private coverage was only 3.34, well below the rule of thumb of 10. Though the percentage of privately insured children with uninsured parents is small, the low correlation coefficients and VIF

suggest there is enough variability in parent insurance after controlling for the child's source of coverage to estimate a relationship between parent insurance and children's visits.

It is important to examine the threats to validity of this study. An assessment of the possibility of measurement error is discussed in the following paragraphs. Measurement error in a variable can produce biased results (Bound et al 2000). Because the variables for this study are based on self-report, the types of measurement error of concern in this study are social desirability bias and recall bias. When describing behaviors through self-report, respondents may indicate they have engaged in a behavior that is desirable when they have not, which is known as social desirability bias (Macek et al 2002, Podsakoff et al 2003). In the context of this study, a parent might report her child received a visit that was not actually received. Social desirability can mask a relationship between two variables or overinflate the relation between two variables (Zerbe and Paulhus 1987, Fisher and Katz 2000). If uninsured children truly are less likely to receive a given visit but their parents are over-reporting visits, social desirability is masking a relationship between parental insurance and children's visits. However, the chances of over-reporting in the MEPS-HC are diminished by the fact that respondents know their medical providers may be contacted for information in the MEPS-Medical Provider Component. Furthermore, the MEPS-HC only requires respondents to report whether their children had a visit over a period of months rather than over the past year, which reduces the pressure a parent feels to report the child had a visit that is only recommended to occur annually (Macek et al 2002). The reporting of an annual dental visit in MEPS-HC was less susceptible to social desirability bias than the National Health

Interview Survey, which asks respondents about visits over the past year (Macek et al 2002). The use of MEPS-HC does not eliminate the potential for social desirability bias with regard to well-child visits in this study, but the chances are less than the study by Davidoff and colleagues that used the National Survey of America's Families, which questions respondents about well-child visits over the past 12 months (Davidoff et al 2003). Social desirability bias is more of a concern with asthma-related visits than well-child visits in this study because asthma-related visits are recommended to occur every six months, and some reporting periods for MEPS-HC respondents can equal or exceed six months.

The data for MEPS-HC are collected retrospectively, so parents could make errors in reporting. They could incorrectly report they were insured for all of 2007 when they were not. A parent could incorrectly report the child had a visit during 2007 when the visit actually occurred at the end of 2006 or the beginning of 2008. A parent could also incorrectly report the reason for a visit. A parent could fail to indicate a visit was for well-child care or mistakenly report a visit was for well-child care when it was not. Interviews with parents indicate they may incorrectly label their children's visits (Earle and Burman 1998, Riportella-Muller et al 1996). For example, a parent might incorrectly label a sports physical as being a well-child visit. Solely using ICD-9 codes to identify well-child visits in this study would not overcome this problem because the ICD-9 codes are produced by professional coders based on information provided by the respondents. These codes are not verified with information from medical providers (Center for Financing, Access, and Cost Trends 2009a).

These errors are of greatest concern if they affect the insured group differently than the uninsured group because this produces recall bias (Raphael 1987). Recall bias can overinflate or mask a relationship, but in this study concern is about whether a relationship is being masked (Infante-Rivard and Jacques 2000). There are not compelling reasons to think insured or uninsured parents would be better at reporting when their children's visits occurred or the reason for those visits. However, uninsured parents may better remember when they lost their insurance than insured parents remember when they gained it, or vice versa. The children of parents who went from insured to uninsured or uninsured to insured during the year were excluded from this study. The inclusion of these children due to memory failure would make it harder to reject the null hypotheses. As mentioned previously, a strength of MEPS-HC is that respondents are asked to report their insurance status over the last several months rather than over the last year. It is easier for respondents to remember events accurately if they occurred recently, so the results are less prone to recall bias than they would be if data from the National Survey of America's Families had been used (Macek et al 2002).

Children were excluded from analyses if they had a person weight of zero because positive person weights are needed for accurate estimates and standard errors when using MEPS-HC. A small proportion of individuals in MEPS-HC are assigned a person weight of zero (Machlin et al 2010). This occurs for individuals in the military or institutions and individuals who belonged to households not sampled for the National Health Interview Survey but subsequently joined households included in MEPS-HC (Center for Financing, Access, and Cost Trends 2009b). Only 150 children were excluded from the 5569 children due to a weight of zero. This is less than three percent. Children were also

excluded if they were missing data on any of the variables in the model. Of the 5419 children who met the eligibility criteria for the study and had a positive person weight, 704 were excluded from analyses due to missing data. In all, 15% of the sample was lost due to a person weight of zero or missing data.

There is no way to include the 150 children who were excluded due to person weights of zero. However, the children who were excluded due to missing data can be included in analyses if the variables on which they are missing are dropped from the model. Parent health, parent risk aversion, and parent self care expectation were not significant predictors of children's utilization. By dropping these variables from the model predicting well-child visits, 452 excluded children can be included in the analysis. Parent insurance still does not have an impact on these encounters. That statement remains true when child health status, child activity limitation, parent worry, parent employment, parent education, parent language, MSA, and region of residence are also dropped and the remaining 252 children are added to the analysis.

There are limitations to the generalizability of the results. The number of children included in MEPS-HC was 8,965. Thirty-eight percent of the 8,965 were excluded from this study because they did not meet the inclusion criteria. The results of this analysis do not apply to children who were excluded. This includes children who were 18 years of age, children who were uninsured for part or all of the year, children who were not linked to a parent, children whose parent was only insured for part of the year, and children whose source of coverage changed during the year.

This study found parental insurance does not have an effect on the likelihood of visits during the year, but no conclusions can be drawn about whether it influences visits

in other ways. For example, nothing can be said about whether parental insurance influences the providers a child uses or the quality of visits. Furthermore, the study does not speak to the likelihood of visits over a longer period of time or the likelihood of well-child visits matching the recommended schedule for children under the age of three.

Social Cognitive Theory Determinants

The variables included in the analyses were chosen because they were believed to capture one or more of the SCT determinants. This section will discuss each variable. Some of the variables predicted children's visits; the predictive variables varied depending on whether well-child or asthma visits were examined. If none of the variables had been predictive, one could not conclude that SCT is inappropriate for modeling children's well-child and asthma visits. In that circumstance, the failure to find any significant relationships could simply be an indication that none of the variables actually captured a SCT determinant. Because at least one variable was predictive, this study supports the future use of SCT to model children's visits, though no conclusions can be made about the determinant(s) represented by a predictive variable.

Parent Health

The PCS-12 and MCS-12 from the SF-12v2 were chosen to measure a parent's health prior to a child's visit, with the expectation that children whose parents were in poorer health were less likely to have a visit than children whose parents were in better health. However, such a relationship was not found for well-child or asthma-related physician visits. Parental health was not related to well-child visits in another study either (Fairbrother et al 2005). The lack of relationship may be because parent health does not have an impact on whether a child receives a visit; thus, it is not a barrier as

proposed. Alternatively, a relationship may not have been found because the selected variables did not capture parent health or did not capture parent health prior to the visit. The PCS-12 and MCS-12 are validated measures of health, so it is unlikely they did not capture parent health (Cheak-Zamora et al 2009). The PCS-12 and MCS-12 were assessed during the middle of the year, so they may or may not represent the health of the parent prior to visits that occurred during the beginning of the year.

Parent Utilization

Parental health care utilization impacted the likelihood of a well-child visit. As predicted, the children of parents with no physician visits were less likely to have a well-child visit than children whose parents had at least one visit. This is a newly identified predictor of well-child visits, as prior studies of well-child visits have not included a measure of parent utilization (Davidoff et al 2003, Gifford et al 2005, Selden 2006, Selden and Hudson 2006, Short and Lefkowitz 1992, Fairbrother et al 2005). The finding agrees with studies that found children are more likely to have a physician visit if their parents also have a visit (Hanson 1998, Newacheck and Halfon 1986). The relationship between parent utilization of physician visits and well-child visits signals parent utilization should be included in future analyses of well-child visits. Furthermore, because parent utilization is associated with the behavior of receiving a well-child visit, parent utilization likely represents at least one SCT determinant. This means SCT should be considered when modeling well-child visits. It remains unclear which determinant(s) parent utilization represents, but because a well-child visit is more likely when a parent has a physician visit, utilization corresponds to reduced barriers, greater behavioral

capability, greater self-efficacy, established goals, positive outcome expectations, and/or greater outcome expectancies.

Asthma-related visits were unaffected by parental utilization. No differences were found between utilization groups in terms of the likelihood of having at least one or at least two asthma-related visits. The lack of effect of this variable for asthma visits as compared to well-child visits makes sense because of the difference between these types of visits. Asthma visits are for children who have experienced symptoms, sought medical attention, and received a medical diagnosis of asthma. The receipt of care in order to receive a diagnosis indicates the parents of children with asthma expect positive outcomes from medical visits for the condition, and they value those outcomes. There is likely little variability in the outcome expectations and outcome expectancies of these parents for asthma visits. Well-child visits, on the other hand, are recommended for all children. There is bound to be great variability in outcome expectations and expectancies for well-child visits between parents, and the children of parents with positive expectations and expectancies are the ones who will receive the visits. The parents who use services themselves are more likely to have positive expectations and expectancies than those who do not use services, explaining why parental utilization was found to have an impact on well-child visits but not asthma visits.

Parent Employment

Parent employment was predictive of whether a child had a visit, though not to the extent expected. Parental employment was proposed to be a barrier to visits regardless of whether it was full- or part-time, with more hours worked creating a larger barrier. Children whose parents were employed part-time were less likely to have a well-

child visit than children whose parents were not working, but there was no difference between children whose parents were employed full-time and children whose parents were not working. A reason why children of parents employed full-time might look like children of parents who are not working is paid sick leave. Full-time employees are likely to have paid sick leave. In 2010, 79% of full-time civilian employees earned paid sick leave compared to only 28% of part-time employees (Bureau of Labor Statistics 2010). Having paid time away from work reduces the barrier employment presents.

The finding of any impact of parent employment on well-child visits contrasts with findings from studies of low-income children (<200% FPL) (Davidoff et al 2003, Gifford et al 2005, Fairbrother et al 2005). This is surprising given low-income workers are less likely than higher-income workers to have paid sick leave through their jobs. Of the lowest-earning quartile of workers, only 35% had paid sick leave (Bureau of Labor Statistics 2010). When the subset of low-income children were examined in this study, parent employment still had an effect.

In contrast, children whose parents were employed full-time were less likely to have at least one or at least two asthma-related visits than children whose parents were not working, but this was not true for children of parents employed part-time. Parents who were employed part-time could take their children when they were not working, but it was more difficult for full-time employees to find time. Apparently the parents employed full-time were not willing to use sick leave or they did not have sick leave. It does not make sense that parents of children with asthma are not willing to take leave for an asthma visit, but parents are willing to take leave for a well-child visit. This is especially true given the discussion above about how parents of children with asthma

already have positive expectations for their children's visits. This leaves the explanation of parents of children with asthma who are employed full-time not having sick leave.

Family Income

Children in families with the incomes below 100% FPL did not differ in their likelihood of a well-child visit from children in families earning up to 400% FPL. Studies including only children in families with incomes below 200% FPL, including the subset analysis from this study, did not find differences with varying levels of income either (Davidoff et al 2003, Gifford et al 2005). Income did matter in this study when comparing the lowest-income children to the highest. An explanation for this is income is a barrier to well-child visits until it reaches a threshold level of 400% FPL. Income did not play a role in asthma-related physician visits, indicating it is not a barrier. However, when the parent health care utilization variable was dropped from the probit model, children in families with incomes of 100%-124% FPL were less likely to have at least one asthma visit than children in families below the poverty line. Parental utilization among the 100%-124% FPL income group must be less than the income group below 100% FPL, so when utilization is dropped, its effect is picked up in the income variable.

Residence in MSA

Residing in a Metropolitan Statistical Area (MSA) meant a child was more likely to have a well-child visit than a child living outside a MSA. This finding lends support to the proposal that residence in a MSA is a facilitator of these health encounters and agrees with previous studies (Davidoff et al 2003, Short and Lefkowitz 1992, Fairbrother et al 2005). There was no difference in asthma-related physician visits between children

residing inside and outside a MSA, indicating residence in a metropolitan area is not a facilitator for these visits.

Child Source of Coverage

Child source of coverage is proposed to capture out-of-pocket cost. The child's source of coverage was not predictive of whether a child had a well-child or asthma-related visits. This was true for low-income children as well, which contrasts with a previous study of low-income children that found children with public insurance were more likely to have a well-child visit than children with private insurance (Davidoff et al 2003). The finding from the earlier study may hinge on coverage differences for publicly and privately insured low-income children. Well-child visits are covered at no cost for children in Medicaid and CHIP (CMS 2011, NCSL 2007, Rosenbaum and Markus 2006). There were no regulations on what private plans could use for cost-sharing for preventive services like well-child visits and immunizations prior to health care reform. Molinari and colleagues found that, on average, at least some cost-sharing was used for these services in private plans (Molinari et al 2007). Any cost-sharing may have been prohibitive for low-income families with private insurance in the study by Davidoff and colleagues (Davidoff et al 2003). The lack of difference between public and private insurance in the low-income children in this study could be changes in the cost-sharing for well-child visits over time. More private insurers may have been offering well-child visits for free in 2007 than in 1999 and 2003, when the data for the Davidoff and Molinari studies were conducted (Davidoff et al 2003, Molinari et al 2007). This also explains the lack of difference between sources of coverage in the overall sample of all incomes in this study.

Number of Children

The number of children in a family did not influence receipt of a well-child visit or asthma-related visits as expected. Well-child visits in low-income children were not affected either. These results disagree with previous studies on well-child visits in low-income children that found more children in a family decreased the likelihood a given child would have a visit (Davidoff et al 2003, Gifford et al 2005, Fairbrother et al 2005). The effect found in those studies may be attributable to the exclusion of other predictor variables.

Parent Language

A parent's comfort with speaking English did not have a significant effect on the likelihood of a child having a well-child visit or asthma-related visits. My study agrees with previous studies that found children with foreign born parents or parents who did not speak English were no less likely to have well-child visits than children with parents born in the U.S. or who spoke English (Davidoff et al 2003, Selden 2006, Fairbrother et al 2005).

Parent Risk Aversion

Parental risk aversion has not previously been included in studies examining well-child or other physician visits and is a contribution of this study. Parent risk aversion was not associated with the likelihood of a well-child visit or asthma-related visits at a significance level of $\alpha=0.05$. However, the difference between children with risk averse and risk loving parents approached statistical significance for having at least two asthma-related visits. Further study is needed, but this suggests parents perceive not taking their children with asthma for multiple visits as risky.

Parent Worry

Parent worry in relation to children's use of well-child and other physician visits has not been examined before. A parent's worry about her child's health was not related to well-child visits or whether a child had at least two asthma-related visits. However, children whose parents indicated they did not know if they worried more about their children's health than other parents were more likely to have an asthma-related visit than children whose parents disagreed that they worried more. The results do not reveal what determinant indicating uncertainty represents, but because their children were more likely to have an asthma-related visit, it represents a determinant that makes behavior more likely. Perhaps these uncertain parents expect more positive outcomes or place greater valuation on outcomes from an asthma visit than parents who do not feel they worry more. That said, it is not clear then why the same effect is not seen for having at least two asthma-related visits.

Two-Parent Household

The number of parents in the household was not found to be predictive of well-child or asthma-related visits. The lack of a relationship with well-child visits is not surprising given most previous studies have not found a connection (Davidoff et al 2003, Gifford et al 2005, Short and Lefkowitz 1992, Fairbrother et al 2005). More surprising is the failure to find a greater likelihood of asthma-related physician visits in the children of single parents because most studies find these children are more likely to have a physician visit (DeVoe et al 2009, Davidoff et al 2003, Hanson 1998, Fairbrother et al 2005). In fact, there is a trend toward the children of single parents being less likely to have at least one asthma-related visit. The reason for the difference may be something

unique about asthma visits, though if this true, it is unclear why there is no trend for two asthma visits. An explanation for children in two-parent families being more likely to have a visit is one parent can manage the rest of the household while the other parent accompanies the child to the doctor.

Parent Education

Parent education was not a significant predictor of well-child visits at the prespecified level of significance of $\alpha=0.05$. However, the difference in probability between children whose parents did not complete high school and children whose parents earned a graduate degree nearly reached this significance level, with the children of parents with a graduate degree being more likely to have a well-child visit. When the parent health care utilization variable was dropped from the probit model, a graduate degree was significant at the $\alpha=0.05$ level. Parents with a graduate degree must be more likely to have a visit than parents who did not complete high school, so when utilization is dropped, the effect of utilization is picked up in the education variable. This threshold of educational attainment is higher than in previous studies. Davidoff and colleagues found the children of parents with any college degree were more likely to have a well-child visit than the children of parents who did not complete high school (Davidoff et al 2003). Short and Lefkowitz found parents need only have completed a high school education for their children to be more likely to have a well-child visit (Short and Lefkowitz 1992).

The relationship between education and asthma-related visits depended on whether having at least one or two visits was examined. Only the children of parents who had earned a bachelor's degree were more likely than the children of parents who

had not completed high school to have at least one asthma visit. The difference between the children of parents who had earned a graduate degree and parents who had not finished high school approached significance at the $\alpha=0.05$ level. Any level of parental education beyond high school increased the likelihood children would have two or more asthma visits, and the difference between no high school and high school trended toward significance at the $\alpha=0.05$ level.

The limited effect of education on whether a child has at least a single visit for asthma indicates there is little variability between parents of different educational levels in terms of whether an asthma visit is necessary, with the exception of those who have earned a bachelor's degree. Alternatively, the study may be underpowered to detect a difference between education levels with only 42 children in the graduate degree category. When it comes to multiple asthma visits, more educated parents are more compelled to take their children than less educated parents. This is likely a reflection of better educated parents knowing their children should be seen by a physician more than once a year.

Oldest Child

Being the oldest child mattered for well-child visits but not asthma visits. Those who were the oldest children in their household were more likely to have a well-child visit than those who were not, a finding in agreement with previous results (Short and Lefkowitz 1992, Tessler 1980). There appears to be a change in parents from their first child to their subsequent children that makes them less likely to take the younger children for a well-child visit. The reason may be a change in outcome expectations as experience is built with the oldest child, as proposed, or a different reason. This change does not

occur for asthma-related visits. Parents' expectations will not change from older to younger children if the older children do not have asthma. Even if the older children do have asthma, parent outcome expectations for younger children may remain stable.

Parent Self-Care Expectation

A parent's agreement with whether she can overcome illness without medical help was proposed to capture her expectations of benefits from medical care. It has not been studied previously in relation to children's visits, but disagreement was expected to correspond to greater likelihood of visits. While not related to whether a child had a well-child visit or at least two asthma-related visits, there was a trend toward statistical significance for having at least one asthma-related visit. Unexpectedly, the children of parents who agreed they could overcome illness without help were more likely to have a visit than children whose parents disagreed. An explanation for this discrepancy is that the question asks whether the parent can overcome illness; it does not specifically ask about whether the parent believes the child can overcome illness. This question may not be a good representation of the parent's outcome expectations for the child.

Child Age

The older a child was, the less likely he or she was to have a well-child visit or at least one asthma-related visit. Age is consistently related to well-child visits, with older children less likely than younger children (Davidoff et al 2003, Gifford et al 2005, Selden 2006, Tessler 1980, Fairbrother et al 2005). The consistent relationship between age and well-child visits indicates age represents at least one determinant of well-child visits. One explanation for this relationship is that young children need vaccinations prior to entering school, and these vaccinations are given at well-child visits. Additionally,

younger children are unable or have difficulty expressing symptoms they are experiencing. Because of this, parents likely have greater outcome expectations and expectancies for both types of visits for younger children than older children. Age may also capture asthma severity, with younger children having more severe asthma than older children (Barnes 2008). Unexpectedly, younger children are not more likely to have multiple visits than older children. It may be that for a child to get more than one visit, the child's parent has to be knowledgeable about asthma visit recommendations or the child's asthma needs to be more severe. In those cases, the age of the child does not matter.

Child Race/Ethnicity

A child's race and ethnicity was not related to whether he or she received a well-child visit or asthma-related visit. There is not a clear consensus in the literature of whether a connection between race and well-child visits exists (Davidoff et al 2003, Gifford et al 2005, Short and Lefkowitz 1992, Tessler 1980, Yu et al 2002).

Child Health

Neither measure of child health (health status and activity limitations) had a significant impact on well-child visits, matching previous results (Davidoff et al 2003, Gifford et al 2005). For asthma-related visits, there was a trend toward children with a limitation due to their health being more likely to have at least two asthma-related visits. When the parent health care utilization variable was dropped from the probit model predicting at least two asthma visits, having a limitation became significant at the $\alpha=0.05$ level. The parents of children with a limitation must be more likely to have a visit than

the parents of children without a limitation, so when utilization is dropped, the effect of utilization is picked up in the limitation variable.

There was a clear association between health status and asthma-related visits, with children in poor or fair health being more likely than children in better health to have at least one and at least two visits. The only exception to this was children in good health are not more likely to have at least one visit than children in poorer health. Children with more severe asthma are more likely than children with less severe asthma to have an asthma-related visit, and parents indicating their children are in poorer health or have an activity limitation seem to be indicating their children have more severe asthma.

Region

Region of residence had a large impact on children's encounters even after controlling for variables that differ between regions such as income, education, parent utilization, child source of coverage, child race/ethnicity, and parent comfort with English. Children in the Northeast were 11, 15 and 21 percentage points more likely to have a well-child visit than children living in the Midwest, South, and West, respectively. The likelihood of having at least one or at least two asthma visits was also greater in the Northeast. Reassurance these findings are accurate is provided by previous studies. Selden found unadjusted differences between the Northeast and the other regions of 13, 18, and 20 percentage points, respectively, for well-child visits (Selden 2006). Children in the Northeast are more likely than the rest of the country to have a physician visit for any reason (DeVoe et al 2009, Hanson 1998). One explanation for these regional differences is more pediatricians per 100,000 children in the Northeast (Chang and Halfon 1997). With more physicians, it may be easier to get an appointment at a

desirable time or find a physician in a convenient location. Another explanation is greater managed care penetration in the Northeast (MCOL 2011, StateHealthFacts 2011). Because of the greater presence of managed care in the region, greater proportions of physicians and patients may have been educated on the importance of preventive and chronic care and incentivized to follow recommendations with regard to these types of care. Thus, physicians in the Northeast may be more likely to recommend well-child and asthma-related visits than physicians in other regions, and individuals living in the region may have more positive outcome expectations and expectancies for these encounters, driving them to demand more.

Parent Sex

Parent sex could only be examined for well-child visits. None of the children with asthma whose parent was a male had an asthma visit, so the parent sex variable was dropped from those analyses. Children whose primary parent was a female were more likely to have a well-child visit than children whose primary parent was a male. This variable has not been studied previously in regard to well-child visits, but females are more likely than males to have a preventive visit with their physicians (Lairson and Swint 1978, Liang et al 1999).

Model Fit

The R-squared for the linear probability model predicting well-child visits was 0.135. The R-squared values for the linear probability models predicting at least one asthma-related physician visit and at least two asthma-related physician visits were 0.199 and 0.174, respectively. The results from this study are comparable to the 10-20% of variance in children's utilization explained by other studies using large national datasets.

The pseudo R-squared for the logit model used by Short and Lefkowitz to predict whether or not children under five years had a well-child visit during the year was 0.159 (Short and Lefkowitz 1992). The adjusted R-squared for a model predicting whether or not a child had a physician visit during the year was 0.094, and the adjusted R-squared for the model predicting the number of visits was 0.188 (Newacheck and Halfon 1986). While comparable, all these studies are limited by the absence of certain variables, requiring selection of an available variable to represent a missing variable. Direct measurement of variables improves the predictive ability of the model. Janicke and Finney were able to directly measure parents' outcome expectations and self-efficacy for physician visits, and their model predicted 33% of the variance in the number of parent-reported visits to the child's primary care provider (Janicke and Finney 2003).

Limitations

MEPS-HC provides rich information about insurance status and medical utilization. However, it does not directly measure all the social cognitive theory determinants of well-child visits and asthma-related physician visits. Available variables thought to best capture the determinants were included in the analyses, but evidence to confirm the linkages is absent. Also lacking is how well parents' responses to questions about themselves translate to responses they would give about their children if asked. Variables that were previously linked to children's visits were used because these variables likely represent at least one of the determinants or they would not be related to visits, but there is no information to support which determinant they represent. This means there may be determinants of children's visits that were not measured at all in the study. This does not bias the results, but it does reduce the explanatory power of the

model. Furthermore, the timing of the variables was not exact. The variables did not necessarily capture a determinant immediately prior to the child's encounter.

All the information in MEPS-HC is self-reported. Some MEPS-HC data is verified with data collected from respondents' medical providers, but the verified data was not used in this study. This means insurance status and any of the other variables could have been incorrectly reported. Parents and children who reported never being uninsured during the year might have actually been uninsured, in which case they should not have been included in the study.

The instrumental variable used for a child depended on whether that child's parent had known eligibility for employer coverage. If eligibility for employer coverage was known, that was the instrument. If unknown, simulated eligibility for Medicaid coverage was used. When these children were combined for the bivariate probit analyses, the instrument was a strong predictor of parent insurance. When the well-child visits for the 3,722 children whose parents had known eligibility for employer coverage were analyzed in isolation, that instrument was strong. However, when the asthma visits for the 400 children whose parents had known eligibility for employer coverage were analyzed separately, the instrument was not strong enough. Furthermore, simulated Medicaid eligibility was not a strong enough predictor of parent insurance in any of the analyses with only the subsamples of children assigned this instrument. If state of residence had been available, Medicaid eligibility could have been determined according to the guidelines in the state where the family lived, but this information is not available in MEPS-HC. Instead, Medicaid eligibility was simulated based on summary measures of eligibility for the region where the family lived rather than the state. Had state been

available, the instrument for this subgroup would likely have been stronger. Despite the weaknesses in the instrument for the subgroups, the instrument for the full samples adequately predicted parent insurance, and the estimates from these bivariate probits can be trusted.

The intention of the study was to assess whether parental insurance has an impact on children's use of routine visits for monitoring asthma. A child's visit was considered to be a monitoring visit if the visit took place in an office or outpatient department, the parent indicated the visit was for asthma, and the parent did not indicate the main purpose of the visit was an emergency. However, it is still possible that unplanned, urgent visits were counted as monitoring visits, and children who did not have a monitoring visit were treated as if they did. This would disproportionately occur in children with poorly controlled asthma because they are more likely to have an urgent visit than children with well-controlled asthma. The child health status and activity limitation variables included in the multivariate analyses may not fully account for asthma control, so the results must be interpreted with this in mind.

Future Research

Neither this study nor any previous study has been able to capture the insurance history of the parents included in the studies. Because of this, the comparisons of children with insured and uninsured parents are made without knowing how long the insured have been insured or how long the uninsured have been uninsured. Within the insured group, there are parents with a variety of insurance histories. Some have never been uninsured, some have been uninsured but maintained continuous insurance once they became insured, and some have experienced fluctuating periods of insurance. This

variety exists in the uninsured group as well. If these groups could be isolated and examined, an impact of parents' insurance on children's health care utilization could still be found. For example, parental insurance may have an impact when it is first gained. Comparisons of the utilization of children of first-time insured parents and never insured parents would reveal whether this is true. If an effect is found, studies could go on to look at how long a parent must be insured for the effect to take hold, how long the effect persists, and whether it continues after a parent loses insurance.

Also waiting to be studied is precisely which social cognitive theory determinants influence children's visits and the magnitude of those effects. Understanding the factors that drive children's visits and the relative importance of those factors is crucial to increasing utilization of recommended services. Interventions will be more effective if directed at the reasons for lack of participation in the services. For example, only 30% of children with asthma had an asthma visit with their health care provider. To raise this rate, we must understand what is stopping children from being evaluated for this chronic condition. This means direct measurement of factors believed to have been captured in this study is needed. Examples include the out-of-pocket cost faced by a family when their child is seen by a provider and a parent's specific expectations from a visit. Also needed is measurement of factors that could not be captured in this study like the recommendations for visit frequency given to the parent by the child's provider. The determinants may vary between health care services, so it is important to examine a variety of services.

Once the determinants of a particular service are determined through direct measurement, it would be valuable to know which variables from national surveys serve

as reliable and valid measures of those determinants. Then the national surveys could be used in studies to reveal the important determinants of other health care services. Surveys like the MEPS-HC offer rich data on health care utilization, but it is unknown how well the included variables measure the social cognitive theory determinants.

Finally, efforts to insure the uninsured will continue under health care reform, and additional parents will become insured. Some of these parents will be enrolled in the same insurance plans as their children while others are enrolled in different plans. Little evidence is available to tell us what impact family insurance patterns have on the health care utilization and outcomes of different family members. This is another area where research is needed.

Conclusions

The intent of this study was to provide stronger evidence than that produced by previous studies on the influence of parental health insurance on whether children receive well-child visits. It was also designed to examine for the first time whether parental insurance impacted the receipt of physician visits for asthma. Children's utilization was modeled using Social Cognitive Theory, and the impact of parental insurance was explained through this theory. Health insurance status for parents and their children was clearer than in previous studies, and instrumental variable analysis was undertaken to determine if parental health insurance was endogenous. These strategies achieved the study's intent and are key to assessing the true influence of parental health insurance on children's utilization in the absence of randomized controlled trials. Parental health insurance does not appear to influence whether children receive a well-child or asthma-related physician visit, and benefits to their children should not be used as justification

for expanding health insurance to more parents. The relationships found between some of the variables representing Social Cognitive Theory determinants and children's health care utilization indicates this theory can be considered for modeling children's utilization in future studies.

APPENDIX A. SUPPLEMENTAL ANALYSES FOR WELL-CHILD VISITS

Table A1 has the characteristics of children excluded from analysis due to a person weight that equaled zero or missing data. Table A2 displays the correlation coefficients between the variables included in the well-child visit model. Tables A3 and A4 have the results of the probit analyses that include children excluded due to missing data. Table A5 presents the results of the probit analysis for children in families with incomes below 200% FPL. Table A6 presents the results of the probit analysis for well-child visits with the parent health care utilization variable dropped. Table A7 displays the variance inflation factors from the linear probability model for well-child visits. Table A8 presents the results of the probit analysis for well-child visits with the child health status variable dropped. Tables A9-A12 contain the bivariate probit results for well-child visits. There is one table for each of the four instruments. In these tables, bold-face type indicates significance at the $\alpha=0.05$ level.

Table A1. Sample Characteristics of Children Excluded Due to Person Weight of Zero or Missing Data, Unweighted

	Excluded				Included (N=4715)
Variable	N	Mean	SD	Range	Mean
Child age (yrs)[a]	854	6.94	5.89	0-17	8.90
Number of children	854	2.44	1.30	1-8	2.50
Parent physical health[a]	378	50.75	8.66	8.48-66.12	51.86
Parent mental health	377	49.38	10.40	15.79-71.36	49.35
		N	**%**		**%**
Parent insured	854	694	81.26		82.65
Child insurance[a]	854				
Private		443	51.87		53.79
Medicaid		362	42.39		41.31
Other public		10	1.17		1.97
Multiple sources		39	4.57		2.93
Two-parent home	854	597	69.91		70.16
Oldest child	854	368	43.09		42.44
Parent use[a]	854				
No visits		220	25.76		24.43
1-2 visits		199	23.30		28.06
3-6 visits		169	19.79		25.01
>6 visits		266	31.15		22.50
Child health[a]	670				
Poor or fair		22	3.28		3.10
Good		136	20.30		16.92
Very good		153	22.84		28.04
Excellent		359	53.58		51.94
Child has limitation	753	24	3.19		4.41
Child race/ethnicity[a]	854				
Caucasian		322	37.70		44.39
African American		179	20.96		18.69
Other		80	9.37		8.14
Hispanic		273	31.97		28.78
Family income	854				
<100% FPL		236	27.63		25.43
100%-124% FPL		51	5.97		6.21
125%-199% FPL		126	14.75		16.44
200%-399% FPL		213	24.94		28.55
≥400% FPL		228	26.70		23.37
MSA	670	587	87.61		84.75
Region of residence[a]	670				
Northeast		104	15.52		15.29
Midwest		131	19.55		21.65
South		198	29.55		34.99

Table A1. Continued

West		237	35.37		28.06
Parent worry	752				
Not worried		450	59.84		61.93
Worried		249	33.11		31.75
Don't know		53	7.05		6.32
Female parent	854	837	98.01		97.79
Parent education[a]	817				
Less than high school		193	23.62		21.17
High school		367	44.92		44.81
Bachelor's		108	13.22		17.54
Graduate degree		73	8.94		7.55
Other degree		76	9.30		8.93
Comfort w/English	845	750	88.76		88.55
Parent employment	796				
Not working		307	38.57		38.15
Part time		179	22.49		25.64
Full time		310	38.94		36.20
Parent risk aversion	287				
Risk neutral		144	50.17		52.13
Risk averse		126	43.90		43.44
Risk loving		17	5.92		4.43
Parent self-care	320				
Neutral		155	48.44		52.79
Positive		13	4.06		3.41
Negative		152	47.50		43.80
Well-child visit	854	440	51.52		49.25

[a]$p<.05$ for chi-square test (categorical variables) or independent samples t-test (continuous variables) comparing excluded to included group

Table A2. Correlations Between Variables Included in Well-Child Visit Model (N=4715)

	WCV	Insured	Age	# kids	Physical health	Mental health	Medicaid	Private	Other public
WCV	1								
Insured	**.06**	1							
Age	**-.22**	**.07**	1						
# kids	**-.07**	**-.10**	-.03	1					
Physical health	.01	-.00	**-.12**	-.02	1				
Mental health	.02	.02	-.00	**-.05**	**.09**	1			
Medicaid	**-.05**	**-.47**	**-.10**	**.24**	**-.18**	**-.16**	1		
Private	**.06**	**.46**	**.09**	**-.25**	**.19**	**.14**	**-.91**	1	
Other pub	**-.04**	.02	**.03**	-.01	.01	**.05**	**-.12**	**-.15**	1
Multiple	.01	.01	-.01	**.05**	**-.06**	.00	**-.15**	**-.19**	-.02
2 parents	**.04**	**.05**	**-.07**	**.04**	**.12**	**.11**	**-.36**	**.36**	-.00
Oldest kid	**.04**	**.06**	**.13**	**-.35**	**.03**	.01	**-.08**	**.09**	-.01
No visits	**-.13**	**-.28**	-.00	**.09**	**.08**	**.09**	**.19**	**-.21**	**.03**
1-2 visits	-.01	.01	.02	-.01	**.11**	**.04**	**-.04**	**.06**	-.01
3-6 visits	**.07**	**.13**	.01	**-.05**	.00	.00	**-.09**	**.09**	**-.04**
>6 visits	**.07**	**.14**	**-.03**	-.03	**-.20**	**-.15**	**-.07**	**.05**	.02
Poor/fair	.00	**-.06**	-.01	.02	**-.05**	**-.10**	**.10**	**-.11**	-.02
Good	-.01	**-.09**	-.00	.02	**-.11**	**-.06**	**.13**	**-.14**	-.02
Very good	-.00	.02	**.03**	**.04**	-.02	**-.04**	**.04**	**-.04**	-.01
Excellent	.01	**.07**	-.02	**-.06**	**.11**	**.11**	**-.18**	**.18**	**.03**
Limitation	.03	-.01	**.04**	.02	**-.07**	**-.08**	**.07**	**-.08**	-.01
White	**.08**	**.20**	.01	**-.08**	**.12**	-.00	**-.36**	**.37**	.02
Black	-.01	.02	.02	**.03**	**-.11**	.02	**.17**	**-.18**	-.01
Other	.01	**.07**	-.02	**-.06**	-.01	.02	**-.06**	**.07**	.01
Hispanic	**-.08**	**-.28**	-.02	**.10**	-.03	-.02	**.29**	**-.29**	-.02
<100% FPL	-.03	**-.23**	**-.10**	**.30**	**-.18**	**-.15**	**.58**	**-.57**	**-.04**
100-124% FPL	-.02	**-.12**	.00	**.07**	**-.04**	.00	**.18**	**-.19**	-.02
125-199% FPL	**-.07**	**-.14**	.00	.01	**-.04**	-.01	**.14**	**-.15**	-.01
200-399% FPL	-.02	**.17**	**.05**	**-.12**	**.06**	**.06**	**-.35**	**.35**	**.04**
≥400% FPL	**.12**	**.25**	**.04**	**-.23**	**.17**	**.11**	**-.45**	**.46**	.02
MSA	**.09**	**.04**	**-.04**	**-.03**	**.05**	**.06**	**-.05**	**.06**	-.01
Northeast	**.13**	**.14**	**.04**	.02	**-.04**	**.06**	-.03	**.03**	**-.03**
Midwest	**.05**	**.09**	-.03	.01	**.04**	-.02	**-.10**	**.11**	**-.06**
South	**-.09**	**-.20**	.00	.00	-.02	-.03	**.08**	**-.09**	**.05**
West	**-.06**	.02	-.01	-.02	.01	-.00	.02	**-.03**	.03
No worry	-.00	**.14**	**.06**	**.05**	**.09**	**.10**	**-.19**	**.18**	**.04**
Worried	-.01	**-.13**	**-.04**	-.02	**-.09**	**-.10**	**.21**	**-.20**	**-.03**
Don't know	.01	-.03	**-.04**	**-.06**	-.00	-.01	-.03	.03	-.02
Female	**.05**	-.02	**-.07**	**.07**	**.03**	-.01	.03	-.02	**-.03**

Table A2. Continued

	WCV	Insured	Age	# kids	Physical health	Mental health	Medicaid	Private	Other public
No high schl	**-.09**	**-.25**	-.02	**.18**	**-.08**	**-.09**	**.40**	**-.39**	**-.05**
High school	**-.04**	-.02	**.06**	-.02	**-.08**	-.02	**.09**	**-.10**	.02
Bachelor's	**.10**	**.17**	**-.07**	**-.07**	**.10**	**.07**	**-.32**	**.32**	.02
Grad degree	**.10**	**.13**	**-.03**	**-.10**	**.09**	**.04**	**-.23**	**.25**	-.02
Other degree	-.02	**.06**	**.03**	-.04	.02	**.04**	**-.09**	**.08**	**.03**
English	**.07**	**.36**	**.04**	**-.10**	-.01	.02	**-.30**	**.28**	**.04**
Unemployed	**.03**	**-.15**	**-.12**	**.25**	**-.14**	**-.10**	**.29**	**-.30**	.01
Part time	.01	.02	.02	**-.06**	**.06**	-.00	**-.04**	**.05**	-.02
Full time	**-.04**	**.14**	**.10**	**-.20**	**.08**	**.11**	**-.26**	**.26**	.00
Risk averse	.02	**.10**	**.06**	**-.04**	-.01	**.08**	**-.07**	**.08**	.02
Risk neutral	-.01	**-.07**	**-.06**	.02	-.01	**-.08**	**.05**	**-.05**	-.02
Risk loving	**-.03**	**-.05**	.00	.03	**.04**	.00	**.04**	**-.05**	.01
Negative	-.02	-.02	**.07**	-.00	**-.11**	-.01	**.08**	**-.08**	-.00
Neutral	**.03**	**.03**	**-.06**	-.01	**.11**	.01	**-.10**	**.09**	.00
Positive	**-.04**	**-.04**	-.02	.03	.02	.00	**.05**	**-.05**	-.00

	Multiple	2 parents	Oldest kid	No visits	1-2 visits	3-6 visits	>6 visits	Poor/fair	Good
Multiple	1								
2 parents	**-.03**	1							
Oldest kid	-.02	**-.03**	1						
No visits	.02	**-.03**	**-.05**	1					
1-2 visits	**-.05**	.03	.00	**-.36**	1				
3-6 visits	.01	-.01	.01	**-.33**	**-.36**	1			
>6 visits	.02	.02	**.03**	**-.31**	**-.34**	**-.31**	1		
Poor/fair	**.04**	**-.07**	-.01	.00	.00	.00	-.01	1	
Good	**.03**	**-.09**	**-.04**	.02	.00	-.02	.00	**-.08**	1
Very good	.00	-.01	.01	.02	**-.03**	.00	.01	**-.11**	**-.28**
Excellent	**-.04**	**.10**	.02	**-.03**	.03	.01	-.01	**-.19**	**-.47**
Limitation	**.04**	**-.05**	**.03**	**-.04**	**-.03**	**.05**	**.03**	**.13**	**.12**
White	**-.04**	**.22**	**.05**	**-.18**	-.00	**.06**	**.12**	**-.06**	**-.12**
Black	**.05**	**-.32**	-.02	**.04**	.00	-.00	**-.04**	**.05**	**.04**
Other	**-.04**	**.04**	.03	.00	.00	.01	-.01	.01	.00
Hispanic	**.03**	.01	**-.06**	**.16**	-.01	**-.07**	**-.09**	.02	**.10**
<100% FPL	**.03**	**-.34**	**-.09**	**.11**	**-.04**	**-.05**	-.02	**.06**	**.11**
100-124% FPL	**.06**	**-.06**	**-.04**	**.08**	-.03	**-.04**	-.02	**.07**	.01
125-199% FPL	**.04**	**-.06**	-.02	**.06**	-.01	.00	**-.05**	.01	**.04**
200-399% FPL	**-.04**	**.17**	.03	**-.06**	**.04**	.01	.00	**-.04**	-.03
≥400% FPL	**-.06**	**.26**	**.10**	**-.15**	.02	**.05**	**.08**	**-.07**	**-.12**

	Multiple	2 parents	Oldest kid	No visits	1-2 visits	3-6 visits	>6 visits	Poor/fair	Good
MSA	-.02	.02	.01	-.01	-.00	-.01	.02	-.00	-.02
Northeast	.02	**-.05**	-.01	**-.06**	-.01	**.05**	.02	-.00	**-.05**
Midwest	.00	.03	.02	**-.10**	.02	**.03**	**.04**	-.02	-.02
South	-.02	**-.04**	-.01	**.10**	-.00	**-.07**	**-.04**	.02	.03
West	.00	**.06**	-.00	**.03**	-.01	-.00	-.02	.01	**.03**
No worry	.00	**.05**	-.03	**-.07**	.02	**.03**	.03	**-.13**	**-.12**
Worried	-.01	**-.07**	.01	**.09**	-.02	**-.03**	**-.04**	**.13**	**.12**
Don't know	.01	.03	**.05**	-.02	-.00	.01	.02	.01	.00
Female	.02	**.23**	**-.03**	.00	-.01	-.01	.02	-.01	.01
No high schl	.03	**-.06**	**-.10**	**.16**	-.03	**-.08**	**-.06**	**.05**	**.14**
High school	.02	**-.16**	.03	.01	.01	.01	**-.04**	**.03**	-.02
Bachelor's	-.02	**.18**	**.04**	**-.09**	**-.05**	**.06**	**.04**	**-.05**	**-.07**
Grad degree	**-.03**	**.13**	**.05**	**-.08**	.00	.01	**.07**	**-.03**	**-.07**
Other degree	-.01	.00	-.00	**-.06**	.02	.02	.02	**-.03**	-.02
English	.01	**-.07**	**.06**	**-.16**	.01	**.07**	**.08**	**-.03**	**-.10**
Unemployed	**.04**	.02	**-.08**	**.07**	**-.05**	**-.04**	.02	.03	**.07**
Part time	**-.03**	.02	.02	**-.06**	**.04**	-.01	**.04**	-.00	**-.04**
Full time	-.01	**-.04**	**.06**	-.01	.02	**.05**	**-.05**	-.03	**-.03**
Risk averse	**-.05**	**.06**	-.00	**-.10**	.03	**.05**	.02	-.02	**-.04**
Risk neutral	**.03**	**-.05**	.01	**.07**	-.01	**-.04**	-.02	.01	.03
Risk loving	**.03**	-.02	-.02	**.05**	**-.04**	-.02	.01	.03	.03
Negative	-.01	.00	-.02	**-.06**	-.02	**.04**	**.04**	.01	**.03**
Neutral	.02	-.00	.02	**.03**	.01	-.02	-.02	-.00	**-.04**
Positive	-.02	.01	-.01	**.07**	**.03**	**-.05**	**-.05**	-.01	**.03**

	Very good	Excellent	Limitation	White	Black	Other	Hispanic	<100% FPL	100-124% FPL
Very good	1								
Excellent	**-.65**	1							
Limitation	-.02	**-.11**	1						
White	-.01	**.12**	-.00	1					
Black	-.02	-.03	.02	**-.43**	1				
Other	-.01	.00	.00	**-.27**	**-.14**	1			
Hispanic	.03	**-.11**	-.02	**-.57**	**-.30**	**-.19**	1		
<100% FPL	**.04**	**-.13**	**.04**	**-.27**	**.17**	**-.05**	**.19**	1	
100-124% FPL	-.00	-.03	-.01	**-.10**	.00	-.03	**.12**	**-.15**	1
125-199% FPL	-.01	-.03	.01	**-.13**	**.08**	**-.03**	**.09**	**-.26**	**-.11**
200-399% FPL	-.00	**.04**	-.02	**.13**	**-.08**	.03	**-.10**	**-.37**	**-.16**
≥400% FPL	-.02	**.14**	-.02	**.31**	**-.16**	**.07**	**-.23**	**-.32**	**-.14**

	Very good	Excellent	Limitation	White	Black	Other	Hispanic	<100% FPL	100-124% FPL
MSA	-.00	.02	.00	**-.15**	**.06**	**.04**	**.09**	**-.05**	-.02
Northeast	.02	.02	-.01	**.04**	**.05**	-.02	**-.07**	.01	-.02
Midwest	.00	.02	.01	**.19**	-.01	-.03	**-.19**	-.02	**-.05**
South	**-.04**	.01	-.00	**-.03**	**.18**	**-.06**	**-.08**	**.04**	.02
West	.02	**-.05**	-.00	**-.18**	**-.22**	**.11**	**.32**	-.02	**.04**
No worry	**-.03**	**.17**	**-.16**	**.22**	.03	.00	**-.26**	**-.15**	**-.06**
Worried	.01	**-.15**	**.17**	**-.25**	-.00	-.01	**.29**	**.16**	**.06**
Don't know	**.04**	**-.04**	-.00	**.05**	**-.05**	.02	-.03	-.02	-.01
Female	-.02	.02	.00	**-.03**	-.02	.01	**.05**	**.04**	.03
No high schl	**.04**	**-.16**	.01	**-.31**	**-.05**	**-.08**	**.44**	**.35**	**.12**
High school	**-.03**	**.03**	-.01	-.01	**.15**	-.01	**-.11**	**.04**	.01
Bachelor's	.01	**.06**	.00	**.21**	**-.12**	**.08**	**-.18**	**-.23**	**-.10**
Grad degree	**-.04**	**.10**	.00	**.14**	**-.07**	**.06**	**-.13**	**-.16**	**-.06**
Other degree	.02	.01	-.00	**.06**	**.03**	**-.04**	**-.07**	**-.11**	-.00
English	**-.05**	**.13**	.03	**.31**	**.16**	**.05**	**-.51**	**-.20**	**-.08**
Unemployed	-.01	**-.05**	.02	**-.11**	**-.05**	-.02	**.18**	**.34**	.03
Part time	**.06**	-.02	.02	**.09**	.01	.00	**-.11**	**-.08**	.02
Full time	**-.04**	.07	**-.04**	**.03**	**.05**	.02	**-.09**	**-.28**	**-.05**
Risk averse	.00	**.04**	.00	**.07**	.02	-.01	**-.09**	**-.05**	.02
Risk neutral	.01	**-.03**	-.01	**-.05**	-.02	.02	**.06**	**.05**	-.03
Risk loving	-.02	-.01	.00	**-.07**	-.01	-.01	**.08**	.01	.02
Negative	-.01	-.02	**.03**	**-.13**	**.05**	-.00	**.11**	**.07**	.02
Neutral	.01	.02	-.02	**.15**	**-.05**	.01	**-.13**	**-.08**	**-.03**
Positive	-.01	-.01	-.01	**-.06**	.01	-.01	**.07**	**.04**	.01

	125-199% FPL	200-399% FPL	≥400% FPL	MSA	Northeast	Midwest	South	West	No worry
125-199% FPL	1								
200-399% FPL	**-.28**	1							
≥400% FPL	**-.24**	**-.35**	1						
MSA	**-.04**	-.01	**.11**	1					
Northeast	-.01	-.02	**.04**	**.10**	1				
Midwest	**-.03**	.03	**.05**	**-.03**	**-.22**	1			
South	.01	.02	**-.07**	**-.16**	**-.31**	**-.39**	1		
West	**.03**	-.02	.00	**.12**	**-.27**	**-.33**	**-.46**	1	
No worry	-.03	**.06**	**.15**	-.00	**.03**	**.10**	.01	**-.13**	1
Worried	**.05**	**-.06**	**-.18**	.02	-.01	**-.09**	-.02	**.11**	**-.87**
Don't know	**-.03**	.01	**.04**	**-.04**	**-.04**	**-.04**	.01	**.05**	**-.33**
Female	-.00	**-.03**	-.02	**.04**	.00	-.00	-.02	.02	-.01

Table A2. Continued

No high schl	**.04**	**-.18**	**-.27**	-.01	**-.07**	-.10	-.02	**.16**	**-.24**
High school	**.12**	**.05**	**-.20**	**-.07**	**.03**	.01	**.06**	**-.09**	**.04**
Bachelor's	**-.12**	**.07**	**.32**	**.09**	.02	**.05**	**-.03**	-.03	**.10**
Grad degree	**-.10**	-.02	**.31**	**.04**	**.04**	**.03**	**-.04**	-.02	**.08**
Other degree	-.01	**.10**	.01	-.01	-.01	.02	.00	-.02	**.05**
English	**-.06**	**.11**	**.18**	**-.07**	**.08**	**.13**	**.04**	**-.22**	**.24**
Unemployed	-.01	**-.16**	**-.19**	.00	**.04**	**-.07**	-.01	**.05**	**-.08**
Part time	.01	.01	**.05**	.00	**.04**	**.05**	**-.06**	-.02	**.03**
Full time	.00	**.15**	**.15**	-.00	**-.08**	.02	**.07**	**-.03**	**.05**
Risk averse	**-.06**	**.04**	**.05**	-.01	**.04**	.02	.00	**-.05**	**.06**
Risk neutral	**.04**	-.02	**-.04**	.01	**-.04**	.01	-.01	**.03**	**-.05**
Risk loving	**.05**	**-.04**	-.02	.00	-.01	**-.06**	.00	**.06**	-.03
Negative	-.02	**-.06**	-.01	**.04**	**.07**	**-.06**	-.01	.01	**-.05**
Neutral	.01	**.06**	.02	**-.04**	**-.06**	**.07**	.01	-.03	**.07**
Positive	.01	-.02	**-.04**	.01	-.02	**-.04**	.01	**.04**	**-.04**

	Worried	Don't know	Female	No high school	High school	Bachelor's	Graduate degree	Other degree	English
Worried	1								
Don't know	**-.18**	1							
Female	.02	-.01	1						
No high schl	**.26**	-.03	**.03**	1					
High school	**-.03**	-.02	**-.04**	**-.47**	1				
Bachelor's	**-.12**	**.03**	.02	**-.24**	**-.42**	1			
Grad degree	**-.09**	.01	.02	**-.15**	**-.26**	**-.13**	1		
Other degree	**-.06**	.01	-.02	**-.16**	**-.28**	**-.14**	**-.09**	1	
English	**-.26**	.02	**-.04**	**-.51**	**.22**	**.13**	**.09**	**.09**	1
Unemployed	**.09**	-.01	**.07**	**.25**	-.03	**-.10**	**-.10**	**-.08**	**-.18**
Part time	**-.03**	.00	**.06**	**-.10**	.02	**.05**	.02	.02	**.09**
Full time	**-.06**	.01	**-.13**	**-.16**	.01	**.06**	**.09**	**.06**	**.10**
Risk averse	**-.04**	**-.05**	.03	**-.11**	.02	**.03**	.03	**.05**	**.11**
Risk neutral	**.03**	**.04**	-.03	**.08**	-.01	-.02	-.02	**-.04**	**-.06**
Risk loving	.03	.00	-.00	**.07**	-.03	-.02	-.01	-.02	**-.10**
Negative	**.08**	**-.05**	.03	**.08**	-.01	**-.04**	-.01	**-.04**	**-.09**
Neutral	**-.10**	**.05**	-.02	**-.11**	.02	**.05**	.01	**.05**	**.12**
Positive	**.04**	-.00	-.01	**.07**	**-.03**	**-.03**	.01	-.02	**-.06**

	Unemployed	Part time	Full time	Risk averse	Risk neutral	Risk loving	Negative	Neutral	Positive
Unemployed	1								

Table A2. Continued

	Unemployed	Part time	Full time	Risk averse	Risk neutral	Risk loving	Negative	Neutral	Positive
Part time	**-.46**	1							
Full time	**-.59**	**-.44**	1						
Risk averse	-.02	**.04**	-.01	1					
Risk neutral	.00	-.01	.01	**-.91**	1				
Risk loving	**.05**	**-.07**	.02	**-.19**	**-.22**	1			
Negative	**.05**	**-.06**	.00	**.27**	**-.24**	**-.05**	1		
Neutral	**-.05**	**.06**	-.01	**-.23**	**.24**	-.03	**-.93**	1	
Positive	-.02	-.00	.02	**-.08**	-.00	**.20**	**-.17**	**-.20**	1

Table A3. Coefficients and Marginal Effects from Probit Model Predicting Well-Child Visit that Includes Children with Missing Parent Health, Parent Risk Aversion, or Parent Self Care Expectation (N=5167)

Variable	b[a]	SE	p	Marginal effects
Parent insured	.028	.090	.754	.01
Child age (yrs)	**-.064**	**.005**	**<.001**	**-.03**
Number of children	-.049	.030	.107	-.02
Child insurance: private[b]	-.067	.086	.435	-.03
Child insurance: other public[b]	-.197	.190	.301	-.08
Child insurance: multiple sources[b]	.118	.176	.502	.05
Two-parent home	-.035	.074	.642	-.01
Oldest child	**.137**	**.044**	**.002**	**.05**
Parent use: 1-2 visits[c]	**.243**	**.081**	**.003**	**.10**
Parent use: 3-6 visits[c]	**.386**	**.083**	**<.001**	**.15**
Parent use: >6 visits[c]	**.421**	**.080**	**<.001**	**.17**
Child health: good[d]	-.012	.142	.935	-.005
Child health: very good[d]	-.064	.131	.624	-.03
Child health: excellent[d]	-.095	.127	.455	-.04
Child has limitation	.170	.104	.104	.07
Child race: African American[e]	-.115	.082	.165	-.05
Child race: other[e]	-.084	.090	.348	-.03
Child race: Hispanic[e]	-.037	.088	.678	-.01
Family income: 100%-124% FPL[f]	.151	.132	.256	.06
Family income: 125%-199% FPL[f]	.024	.101	.815	.01
Family income: 200%-399% FPL[f]	.114	.113	.313	.05
Family income: ≥400% FPL[f]	**.340**	**.131**	**.010**	**.14**
Metropolitan Statistical Area	**.280**	**.081**	**.001**	**.11**
Region: Midwest[g]	**-.246**	**.095**	**.010**	**-.10**
Region: South[g]	**-.335**	**.089**	**<.001**	**-.13**
Region: West[g]	**-.483**	**.096**	**<.001**	**-.19**
Parent worry: worried[h]	.095	.061	.120	.04
Parent worry: don't know[h]	-.048	.111	.666	-.02
Female parent	**.432**	**.167**	**.010**	**.17**
Parent education: high school[i]	-.006	.092	.946	-.002
Parent education: bachelor's degree[i]	.083	.110	.449	.03
Parent education: graduate degree[i]	**.271**	**.126**	**.032**	**.11**
Parent education: other degree[i]	-.025	.116	.830	-.01
Comfort w/English	.187	.112	.094	.07
Parent employment: part time[j]	**-.160**	**.075**	**.034**	**-.06**
Parent employment: full time[j]	**-.140**	**.071**	**.049**	**-.06**
Constant	-.117	.269	.663	

Model fit: F(36, 390)=8.41, p<.001

[a]Coefficients from probit model predicting well-child visit: no visit=0, visit=1

Table A3. Continued

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

Table A4. Coefficients and Marginal Effects from Probit Model Predicting Well-Child Visit that Includes Children Excluded Due to Any Missing Data (N=5419)

Variable	b[a]	SE	p	Marginal effects
Parent insured	.073	.084	.380	.03
Child age (yrs)	**-.067**	**.005**	**<.001**	**-.03**
Number of children	-.026	.030	.393	-.01
Child insurance: private[b]	-.033	.086	.705	-.01
Child insurance: other public[b]	-.255	.184	.167	-.10
Child insurance: multiple sources[b]	.085	.184	.645	.03
Two-parent home	-.024	.073	.739	-.01
Oldest child	**.153**	**.042**	**<.001**	**.06**
Parent use: 1-2 visits[c]	**.249**	**.079**	**.002**	**.10**
Parent use: 3-6 visits[c]	**.419**	**.083**	**<.001**	**.17**
Parent use: >6 visits[c]	**.455**	**.079**	**<.001**	**.18**
Child race: African American[d]	-.086	.077	.264	-.03
Child race: other[d]	-.096	.086	.270	-.04
Child race: Hispanic[d]	-.094	.071	.190	-.04
Family income: 100%-124% FPL[e]	.054	.127	.672	.02
Family income: 125%-199% FPL[e]	-.041	.094	.667	-.02
Family income: 200%-399% FPL[e]	.042	.106	.694	.02
Family income: ≥400% FPL[e]	**.322**	**.119**	**.007**	**.13**
Female parent	**.444**	**.161**	**.006**	**.18**
Constant	-.187	.201	.355	

Model fit: $F(19, 408)=15.16$, $p<.001$

[a]Coefficients from probit model predicting well-child visit: no visit=0, visit=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child race/ethnicity: Caucasian

[e]Reference category: Family income: <100% FPL

Table A5. Coefficients and Marginal Effects from Probit Model Predicting Well-Child Visit in Low-Income Children (N=2267)

Variable	b[a]	SE	p	Marginal effects
Parent insured	-.077	.113	.496	-.03
Child age (yrs)	**-.071**	**.008**	**<.001**	**-.03**
Number of children	.005	.042	.914	.002
Parent physical health score (PCS-12)	-.003	.004	.540	-.001
Parent mental health score (MCS-12)	.003	.004	.495	.001
Child insurance: private[b]	.077	.115	.505	.03
Child insurance: other public[b]	-.480	.344	.164	-.19
Child insurance: multiple sources[b]	-.039	.219	.857	-.02
Two-parent home	-.120	.106	.261	-.05
Oldest child	.127	.071	.074	.05
Parent use: 1-2 visits[c]	**.267**	**.122**	**.029**	**.11**
Parent use: 3-6 visits[c]	.156	.119	.192	.06
Parent use: >6 visits[c]	.233	.131	.076	.09
Child health: good[d]	-.113	.173	.515	-.04
Child health: very good[d]	-.155	.158	.327	-.06
Child health: excellent[d]	-.137	.155	.378	-.05
Child has limitation	.227	.138	.101	.09
Child race: African American[e]	-.026	.119	.829	-.01
Child race: other[e]	-.261	.181	.150	-.10
Child race: Hispanic[e]	-.136	.131	.298	-.05
Family income: 100%-124% FPL[f]	.141	.137	.305	.06
Family income: 125%-199% FPL[f]	.034	.113	.765	.01
Metropolitan Statistical Area	.065	.124	.601	.03
Region: Midwest[g]	-.225	.161	.163	-.09
Region: South[g]	**-.597**	**.147**	**<.001**	**-.24**
Region: West[g]	**-.370**	**.145**	**.011**	**-.15**
Parent worry: worried[h]	.083	.091	.360	.03
Parent worry: don't know[h]	.245	.196	.213	.10
Female parent	.112	.263	.671	.04
Parent education: high school[i]	-.007	.105	.950	-.003
Parent education: bachelor's degree[i]	.312	.198	.116	.12
Parent education: graduate degree[i]	**1.022**	**.408**	**.013**	**.41**
Parent education: other degree[i]	**-.416**	**.189**	**.029**	**-.17**
Comfort w/English	.166	.141	.239	.07
Parent employment: part time[j]	-.219	.114	.054	-.09
Parent employment: full time[j]	**-.261**	**.105**	**.013**	**-.10**
Parent risk aversion: risk neutral[k]	-.112	.089	.210	-.04
Parent risk aversion: risk loving[k]	-.227	.218	.297	-.09
Parent self-care expectation: neutral[l]	.082	.098	.401	.03
Parent self-care expectation: positive[l]	.086	.211	.682	.03
Constant	.701	.484	.148	

Table A5. Continued
Model fit: F(40, 323)=3.96, p<.001

[a]Coefficients from probit model predicting well-child visit: no visit=0, visit=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

Table A6. Coefficients and Marginal Effects from Probit Model Predicting Well-Child Visit that Does Not Include Parental Health Care Utilization (N=4715)

Variable	b[a]	SE	p	Marginal effects
Parent insured	.099	.089	.268	.04
Child age (yrs)	**-.065**	**.005**	**<.001**	**-.03**
Number of children	-.049	.032	.119	-.02
Parent physical health score (PCS-12)	.001	.003	.779	.0004
Parent mental health score (MCS-12)	-.001	.003	.614	-.001
Child insurance: private[b]	-.051	.090	.571	-.02
Child insurance: other public[b]	-.223	.189	.239	-.09
Child insurance: multiple sources[b]	.089	.192	.643	.04
Two-parent home	-.044	.077	.571	-.02
Oldest child	**.136**	**.045**	**.003**	**.05**
Child health: good[c]	-.070	.148	.636	-.03
Child health: very good[c]	-.133	.137	.333	-.05
Child health: excellent[c]	-.155	.134	.246	-.06
Child has limitation	.168	.109	.125	.07
Child race: African American[d]	-.126	.087	.150	-.05
Child race: other[d]	-.059	.093	.526	-.02
Child race: Hispanic[d]	-.044	.090	.622	-.02
Family income: 100%-124% FPL[e]	.087	.134	.514	.03
Family income: 125%-199% FPL[e]	-.006	.104	.955	-.002
Family income: 200%-399% FPL[e]	.083	.117	.478	.03
Family income: ≥400% FPL[e]	**.345**	**.137**	**.012**	**.14**
Metropolitan Statistical Area	**.281**	**.083**	**.001**	**.11**
Region: Midwest[f]	**-.282**	**.094**	**.003**	**-.11**
Region: South[f]	**-.380**	**.089**	**<.001**	**-.15**
Region: West[f]	**-.515**	**.098**	**<.001**	**-.20**
Parent worry: worried[g]	.083	.065	.201	.03
Parent worry: don't know[g]	-.016	.114	.888	-.01
Female parent	**.472**	**.169**	**.005**	**.19**
Parent education: high school[h]	-.008	.092	.932	-.003
Parent education: bachelor's degree[h]	.130	.113	.249	.05
Parent education: graduate degree[h]	**.278**	**.133**	**.037**	**.11**
Parent education: other degree[h]	.066	.122	.588	.03
Comfort w/English	.191	.121	.114	.08
Parent employment: part time[i]	**-.174**	**.076**	**.022**	**-.07**
Parent employment: full time[i]	-.119	.076	.117	-.05
Parent risk aversion: risk neutral[j]	.019	.061	.753	.01
Parent risk aversion: risk loving[j]	-.153	.156	.329	-.06
Parent self-care expectation: neutral[k]	.026	.062	.678	.01
Parent self-care expectation: positive[k]	-.199	.178	.266	-.08
Constant	.165	.364	.651	

Model fit: $F(39, 382)=7.20$, $p<.001$

Table A6. Continued

[a]Coefficients from probit model predicting well-child visit: no visit=0, visit=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Child health: fair/poor

[d]Reference category: Child race/ethnicity: Caucasian

[e]Reference category: Family income: <100% FPL

[f]Reference category: Region: Northeast

[g]Reference category: Parent worry: not worried

[h]Reference category: Parent education: No high school diploma or GED

[i]Reference category: Parent employment: not working

[j]Reference category: Parent risk aversion: risk averse

[k]Reference category: Parent self care expectation: negative

Table A7. Variance Inflation Factors (VIFs) from Linear Probability Model Predicting Well-Child Visit (N=4715)

Variable	VIF
Child health: excellent	11.89
Child health: very good	9.92
Child health: good	6.26
Family income: ≥400% FPL	5.69
Family income: 200%-399% FPL	4.35
Parent education: high school	3.78
Parent education: bachelor's degree	3.77
Child insurance: private	3.10
Parent education: graduate degree	2.62
Parent education: other degree	2.31
Region: South	2.12
Parent use: >6 visits	2.03
Region: West	1.95
Parent use: 3-6 visits	1.91
Family income: 125%-199% FPL	1.89
Region: Midwest	1.87
Parent use: 1-2 visits	1.82
Parent employment: full time	1.77
Two-parent home	1.62
Child race: Hispanic	1.62
Comfort w/English	1.61
Parent employment: part time	1.54
Parent insured	1.51
Number of children	1.48
Child race: African American	1.36
Family income: 100%-124% FPL	1.27
Parent worry: worried	1.23
Parent physical health score (PCS-12)	1.21
Parent self-care expectation: neutral	1.20
Child insurance: other public	1.20
Oldest child	1.20
Female parent	1.18
Parent risk aversion: risk neutral	1.18
Parent risk aversion: risk loving	1.16
Parent self-care expectation: positive	1.15
Child age (yrs)	1.15
Child insurance: multiple sources	1.13
Metropolitan Statistical Area	1.11
Parent mental health score (MCS-12)	1.11
Child race: other	1.10
Child has limitation	1.09
Parent worry: don't know	1.07

Table A8. Coefficients and Marginal Effects from Probit Model Predicting Well-Child Visit that Does Not Include Child Health Status (N=4715)

Variable	b[a]	SE	p	Marginal effects
Parent insured	.017	.094	.856	.01
Child age (yrs)	**-.063**	**.005**	**<.001**	**-.03**
Number of children	-.052	.032	.104	-.02
Parent physical health score (PCS-12)	.004	.003	.222	.002
Parent mental health score (MCS-12)	.0005	.003	.875	.0002
Child insurance: private[b]	-.073	.091	.425	-.03
Child insurance: other public[b]	-.201	.198	.310	-.08
Child insurance: multiple sources[b]	.103	.196	.600	.04
Two-parent home	-.020	.077	.794	-.01
Oldest child	**.122**	**.045**	**.007**	**.05**
Parent use: 1-2 visits[c]	**.246**	**.085**	**.004**	**.10**
Parent use: 3-6 visits[c]	**.393**	**.090**	**<.001**	**.16**
Parent use: >6 visits[c]	**.412**	**.089**	**<.001**	**.16**
Child has limitation	.164	.106	.121	.07
Child race: African American[d]	-.077	.088	.380	-.03
Child race: other[d]	-.022	.096	.814	-.01
Child race: Hispanic[d]	-.012	.093	.900	-.005
Family income: 100%-124% FPL[e]	.124	.136	.364	.05
Family income: 125%-199% FPL[e]	-.003	.107	.979	-.001
Family income: 200%-399% FPL[e]	.081	.120	.503	.03
Family income: ≥400% FPL[e]	**.318**	**.142**	**.025**	**.13**
Metropolitan Statistical Area	**.268**	**.086**	**.002**	**.11**
Region: Midwest[f]	**-.283**	**.098**	**.004**	**-.11**
Region: South[f]	**-.366**	**.091**	**<.001**	**-.15**
Region: West[f]	**-.516**	**.099**	**<.001**	**-.21**
Parent worry: worried[g]	.107	.064	.094	.04
Parent worry: don't know[g]	-.017	.115	.882	-.01
Female parent	**.452**	**.167**	**.007**	**.18**
Parent education: high school[h]	-.019	.094	.837	-.01
Parent education: bachelor's degree[h]	.102	.113	.366	.04
Parent education: graduate degree[h]	.252	.132	.057	.10
Parent education: other degree[h]	.030	.121	.807	.01
Comfort w/English	.196	.124	.113	.08
Parent employment: part time[i]	**-.191**	**.077**	**.013**	**-.08**
Parent employment: full time[i]	-.123	.076	.109	-.05
Parent risk aversion: risk neutral[j]	.030	.062	.627	.01
Parent risk aversion: risk loving[j]	-.161	.159	.312	-.06
Parent self-care expectation: neutral[k]	.041	.062	.508	.02
Parent self-care expectation: positive[k]	-.145	.185	.435	-.06
Constant	-.434	.352	.218	

Model fit: $F(39, 382)=7.20$, $p<.001$

Table A8. Continued

[a]Coefficients from probit model predicting well-child visit: no visit=0, visit=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child race/ethnicity: Caucasian

[e]Reference category: Family income: <100% FPL

[f]Reference category: Region: Northeast

[g]Reference category: Parent worry: not worried

[h]Reference category: Parent education: No high school diploma or GED

[i]Reference category: Parent employment: not working

[j]Reference category: Parent risk aversion: risk averse

[k]Reference category: Parent self care expectation: negative

Table A9. Coefficients from Bivariate Probit Model Predicting Well-Child Visit and Parental Insurance Coverage with *Low* Instrumental Variable (N=4715)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.459	.254	.071
Child age (yrs)	**-.063**	**.005**	**<.001**
Number of children	-.048	.033	.145
Parent physical health score (PCS-12)	.004	.004	.315
Parent mental health score (MCS-12)	.0004	.003	.886
Child insurance: private[b]	.078	.122	.524
Child insurance: other public[b]	-.077	.209	.713
Child insurance: multiple sources[b]	.170	.200	.398
Two-parent home	-.028	.078	.722
Oldest child	**.128**	**.046**	**.005**
Parent use: 1-2 visits[c]	**.280**	**.086**	**.001**
Parent use: 3-6 visits[c]	**.440**	**.092**	**<.001**
Parent use: >6 visits[c]	**.461**	**.093**	**<.001**
Child health: good[d]	-.029	.147	.841
Child health: very good[d]	-.084	.138	.546
Child health: excellent[d]	-.119	.133	.372
Child has limitation	.142	.106	.179
Child race: African American[e]	-.047	.090	.602
Child race: other[e]	-.012	.097	.898
Child race: Hispanic[e]	-.027	.093	.772
Family income: 100%-124% FPL[f]	.118	.132	.370
Family income: 125%-199% FPL[f]	-.026	.108	.809
Family income: 200%-399% FPL[f]	.083	.119	.487
Family income: ≥400% FPL[f]	**.324**	**.142**	**.023**
Metropolitan Statistical Area	**.270**	**.086**	**.002**
Region: Midwest[g]	**-.307**	**.100**	**.002**
Region: South[g]	**-.414**	**.096**	**<.001**
Region: West[g]	**-.525**	**.101**	**<.001**
Parent worry: worried[h]	.093	.064	.149
Parent worry: don't know[h]	-.043	.113	.701
Female parent	**.479**	**.171**	**.005**
Parent education: high school[i]	-.040	.096	.678
Parent education: bachelor's degree[i]	.087	.114	.449
Parent education: graduate degree[i]	.240	.134	.072
Parent education: other degree[i]	.010	.121	.933
Comfort w/English	**.310**	**.137**	**.024**
Parent employment: part time[j]	**-.196**	**.078**	**.012**
Parent employment: full time[j]	-.115	.075	.128
Parent risk aversion: risk neutral[k]	.018	.062	.777
Parent risk aversion: risk loving[k]	-.176	.156	.261
Parent self care expectation: neutral[l]	.037	.062	.554

Table A9. Continued

Parent self care expectation: positive[l]	-.165	.185	.373
Constant	.104	.378	.784
Parental insurance coverage			
Parental eligibility for insurance	**.900**	**.126**	**<.001**
Child age (yrs)	-.005	.009	.548
Number of children	.066	.050	.189
Parent physical health score (PCS-12)	-.011	.006	.064
Parent mental health score (MCS-12)	-.007	.005	.165
Child insurance: private[b]	**1.606**	**.193**	**<.001**
Child insurance: other public[b]	**.712**	**.261**	**.007**
Child insurance: multiple sources[b]	.269	.269	.319
Two-parent home	-.155	.127	.225
Oldest child	.088	.062	.158
Parent use: 1-2 visits[c]	**.366**	**.123**	**.003**
Parent use: 3-6 visits[c]	**.701**	**.146**	**<.001**
Parent use: >6 visits[c]	**.663**	**.169**	**<.001**
Child health: good[d]	.227	.194	.243
Child health: very good[d]	.368	.195	.059
Child health: excellent[d]	.182	.198	.360
Child has limitation	-.034	.168	.839
Child race: African American[e]	**.507**	**.170**	**.003**
Child race: other[e]	.327	.207	.115
Child race: Hispanic[e]	-.113	.148	.446
Family income: 100%-124% FPL[f]	.198	.177	.265
Family income: 125%-199% FPL[f]	-.145	.143	.310
Family income: 200%-399% FPL[f]	.094	.212	.659
Family income: ≥400% FPL[f]	**.694**	**.318**	**.030**
Metropolitan Statistical Area	-.004	.150	.980
Region: Midwest[g]	**-.616**	**.261**	**.019**
Region: South[g]	**-1.017**	**.245**	**<.001**
Region: West[g]	-.305	.245	.214
Parent worry: worried[h]	.021	.100	.834
Parent worry: don't know[h]	-.238	.186	.201
Female parent	.657	.431	.128
Parent education: high school[i]	-.232	.142	.104
Parent education: bachelor's degree[i]	-.032	.230	.891
Parent education: graduate degree[i]	**.816**	**.335**	**.015**
Parent education: other degree[i]	-.227	.221	.304
Comfort w/English	**.749**	**.153**	**<.001**
Parent employment: part time[j]	-.065	.128	.611
Parent employment: full time[j]	-.101	.137	.461
Parent risk aversion: risk neutral[k]	**-.240**	**.109**	**.028**
Parent risk aversion: risk loving[k]	**-.394**	**.194**	**.043**
Parent self care expectation: neutral[l]	-.021	.106	.842

Table A9. Continued

Parent self care expectation: positive[l]	-.065	.228	.776
Constant	.262	.644	.685

Model fit: $F(84,337) = 10.02$, $p<.001$

[a]Coefficients from bivariate probit model predicting well-child visit: no visit=0, visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

Table A10. Coefficients from Bivariate Probit Model Predicting Well-Child Visit and Parental Insurance Coverage with *Median* Instrumental Variable (N=4715)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.449	.238	.059
Child age (yrs)	**-.063**	**.005**	**<.001**
Number of children	-.048	.033	.142
Parent physical health score (PCS-12)	.004	.004	.313
Parent mental health score (MCS-12)	.0004	.003	.884
Child insurance: private[b]	.075	.116	.522
Child insurance: other public[b]	-.080	.207	.701
Child insurance: multiple sources[b]	.167	.198	.398
Two-parent home	-.028	.078	.723
Oldest child	**.127**	**.046**	**.006**
Parent use: 1-2 visits[c]	**.278**	**.086**	**.001**
Parent use: 3-6 visits[c]	**.438**	**.091**	**<.001**
Parent use: >6 visits[c]	**.460**	**.092**	**<.001**
Child health: good[d]	-.030	.146	.839
Child health: very good[d]	-.085	.138	.540
Child health: excellent[d]	-.120	.133	.369
Child has limitation	.142	.106	.180
Child race: African American[e]	-.048	.090	.593
Child race: other[e]	-.013	.096	.890
Child race: Hispanic[e]	-.027	.093	.775
Family income: 100%-124% FPL[f]	.119	.132	.369
Family income: 125%-199% FPL[f]	-.025	.108	.816
Family income: 200%-399% FPL[f]	.083	.119	.486
Family income: ≥400% FPL[f]	**.324**	**.142**	**.023**
Metropolitan Statistical Area	**.270**	**.086**	**.002**
Region: Midwest[g]	**-.307**	**.100**	**.002**
Region: South[g]	**-.413**	**.095**	**<.001**
Region: West[g]	**-.525**	**.101**	**<.001**
Parent worry: worried[h]	.093	.064	.149
Parent worry: don't know[h]	-.043	.113	.704
Female parent	**.479**	**.170**	**.005**
Parent education: high school[i]	-.039	.096	.681
Parent education: bachelor's degree[i]	.087	.114	.446
Parent education: graduate degree[i]	.241	.133	.072
Parent education: other degree[i]	.011	.121	.930
Comfort w/English	**.308**	**.136**	**.024**
Parent employment: part time[j]	**-.196**	**.078**	**.012**
Parent employment: full time[j]	-.115	.075	.127
Parent risk aversion: risk neutral[k]	.018	.062	.773
Parent risk aversion: risk loving[k]	-.176	.156	.261

Table A10. Continued

Parent self care expectation: neutral[l]	.037	.062	.552
Parent self care expectation: positive[l]	-.164	.185	.376
Constant	.098	.379	.796
Parental insurance coverage			
Parental eligibility for insurance	**.907**	**.120**	**<.001**
Child age (yrs)	-.010	.009	.243
Number of children	.071	.057	.212
Parent physical health score (PCS-12)	-.012	.006	.051
Parent mental health score (MCS-12)	-.007	.005	.167
Child insurance: private[b]	**1.603**	**.191**	**<.001**
Child insurance: other public[b]	**.722**	**.258**	**.005**
Child insurance: multiple sources[b]	.340	.267	.203
Two-parent home	-.076	.134	.569
Oldest child	.106	.060	.079
Parent use: 1-2 visits[c]	**.400**	**.124**	**.001**
Parent use: 3-6 visits[c]	**.695**	**.147**	**<.001**
Parent use: >6 visits[c]	**.642**	**.171**	**<.001**
Child health: good[d]	.205	.197	.301
Child health: very good[d]	.361	.197	.068
Child health: excellent[d]	.142	.200	.477
Child has limitation	.020	.169	.905
Child race: African American[e]	**.508**	**.171**	**.003**
Child race: other[e]	.300	.203	.141
Child race: Hispanic[e]	-.103	.150	.490
Family income: 100%-124% FPL[f]	.331	.181	.068
Family income: 125%-199% FPL[f]	.013	.146	.928
Family income: 200%-399% FPL[f]	.257	.209	.220
Family income: ≥400% FPL[f]	**.863**	**.308**	**.005**
Metropolitan Statistical Area	-.016	.156	.918
Region: Midwest[g]	**-.644**	**.270**	**.018**
Region: South[g]	**-.931**	**.250**	**<.001**
Region: West[g]	-.325	.251	.196
Parent worry: worried[h]	.008	.099	.939
Parent worry: don't know[h]	-.229	.187	.220
Female parent	.643	.427	.133
Parent education: high school[i]	-.269	.148	.069
Parent education: bachelor's degree[i]	-.096	.228	.672
Parent education: graduate degree[i]	**.701**	**.344**	**.042**
Parent education: other degree[i]	-.002	.180	.990
Comfort w/English	**.775**	**.155**	**<.001**
Parent employment: part time[j]	.070	.132	.598
Parent employment: full time[j]	.011	.130	.931
Parent risk aversion: risk neutral[k]	**-.250**	**.110**	**.023**
Parent risk aversion: risk loving[k]	-.317	.193	.101

Table A10. Continued

Parent self care expectation: neutral[l]	-.031	.106	.769
Parent self care expectation: positive[l]	-.156	.219	.479
Constant	.054	.649	.934

Model fit: $F(84, 337) = 10.43$, $p<.001$

[a]Coefficients from bivariate probit model predicting well-child visit: no visit=0, visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

Table A11. Coefficients from Bivariate Probit Model Predicting Well-Child Visit and Parental Insurance Coverage with *Average* Instrumental Variable (N=4715)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.304	.250	.224
Child age (yrs)	**-.063**	**.005**	**<.001**
Number of children	-.050	.033	.128
Parent physical health score (PCS-12)	.004	.004	.275
Parent mental health score (MCS-12)	.0005	.003	.858
Child insurance: private[b]	.030	.118	.798
Child insurance: other public[b]	-.115	.207	.579
Child insurance: multiple sources[b]	.145	.198	.462
Two-parent home	-.024	.078	.763
Oldest child	**.126**	**.046**	**.006**
Parent use: 1-2 visits[c]	**.268**	**.086**	**.002**
Parent use: 3-6 visits[c]	**.424**	**.092**	**<.001**
Parent use: >6 visits[c]	**.446**	**.092**	**<.001**
Child health: good[d]	-.039	.146	.793
Child health: very good[d]	-.096	.138	.487
Child health: excellent[d]	-.128	.133	.337
Child has limitation	.142	.106	.181
Child race: African American[e]	-.058	.090	.520
Child race: other[e]	-.018	.096	.851
Child race: Hispanic[e]	-.022	.093	.812
Family income: 100%-124% FPL[f]	.120	.133	.369
Family income: 125%-199% FPL[f]	-.019	.108	.859
Family income: 200%-399% FPL[f]	.081	.119	.497
Family income: ≥400% FPL[f]	**.322**	**.142**	**.024**
Metropolitan Statistical Area	**.271**	**.086**	**.002**
Region: Midwest[g]	**-.299**	**.100**	**.003**
Region: South[g]	**-.399**	**.096**	**<.001**
Region: West[g]	**-.522**	**.101**	**<.001**
Parent worry: worried[h]	.094	.064	.146
Parent worry: don't know[h]	-.038	.113	.740
Female parent	.474	.169	.005
Parent education: high school[i]	-.032	.096	.742
Parent education: bachelor's degree[i]	.094	.115	.413
Parent education: graduate degree[i]	.248	.134	.065
Parent education: other degree[i]	.018	.121	.882
Comfort w/English	**.275**	**.137**	**.046**
Parent employment: part time[j]	**-.194**	**.078**	**.013**
Parent employment: full time[j]	-.117	.076	.124
Parent risk aversion: risk neutral[k]	.022	.063	.727
Parent risk aversion: risk loving[k]	-.172	.157	.273
Parent self care expectation: neutral[l]	.038	.062	.537

Table A11. Continued

Parent self care expectation: positive[l]	-.157	.185	.396
Constant	.009	.384	.981
Parental insurance coverage			
Parental eligibility for insurance	**.894**	**.120**	**<.001**
Child age (yrs)	-.011	.009	.237
Number of children	.075	.056	.183
Parent physical health score (PCS-12)	**-.014**	**.006**	**.033**
Parent mental health score (MCS-12)	-.008	.005	.119
Child insurance: private[b]	**1.598**	**.193**	**<.001**
Child insurance: other public[b]	**.743**	**.261**	**.005**
Child insurance: multiple sources[b]	.375	.266	.159
Two-parent home	-.058	.135	.670
Oldest child	.110	.060	.066
Parent use: 1-2 visits[c]	**.411**	**.126**	**.001**
Parent use: 3-6 visits[c]	**.697**	**.149**	**<.001**
Parent use: >6 visits[c]	**.631**	**.173**	**<.001**
Child health: good[d]	.219	.200	.275
Child health: very good[d]	.396	.206	.055
Child health: excellent[d]	.175	.209	.402
Child has limitation	-.004	.171	.979
Child race: African American[e]	**.499**	**.170**	**.003**
Child race: other[e]	.311	.204	.129
Child race: Hispanic[e]	-.075	.151	.618
Family income: 100%-124% FPL[f]	**.363**	**.182**	**.047**
Family income: 125%-199% FPL[f]	.085	.149	.567
Family income: 200%-399% FPL[f]	.339	.210	.108
Family income: ≥400% FPL[f]	**.947**	**.312**	**.003**
Metropolitan Statistical Area	-.020	.156	.899
Region: Midwest[g]	**-.674**	**.276**	**.015**
Region: South[g]	**-.993**	**.253**	**<.001**
Region: West[g]	-.340	.253	.180
Parent worry: worried[h]	-.006	.098	.953
Parent worry: don't know[h]	-.220	.190	.248
Female parent	.615	.439	.162
Parent education: high school[i]	-.276	.148	.063
Parent education: bachelor's degree[i]	-.095	.227	.676
Parent education: graduate degree[i]	**.722**	**.345**	**.037**
Parent education: other degree[i]	-.294	.231	.203
Comfort w/English	**.782**	**.156**	**<.001**
Parent employment: part time[j]	.092	.134	.491
Parent employment: full time[j]	.047	.130	.719
Parent risk aversion: risk neutral[k]	**-.259**	**.111**	**.021**
Parent risk aversion: risk loving[k]	-.327	.197	.098
Parent self care expectation: neutral[l]	-.026	.108	.810

Table A11. Continued

Parent self care expectation: positive[l]	-.118	.222	.594
Constant	.125	.669	.852

Model fit: $F(84, 337) = 10.18$, $p<.001$

[a]Coefficients from bivariate probit model predicting well-child visit: no visit=0, visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

Table A12. Coefficients from Bivariate Probit Model Predicting Well-Child Visit and Parental Insurance Coverage with *High* Instrumental Variable (N=4715)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.209	.262	.426
Child age (yrs)	**-.063**	**.005**	**<.001**
Number of children	-.050	.032	.120
Parent physical health score (PCS-12)	.004	.004	.254
Parent mental health score (MCS-12)	.0006	.003	.841
Child insurance: private[b]	.0007	.123	.996
Child insurance: other public[b]	-.138	.211	.514
Child insurance: multiple sources[b]	.130	.200	.515
Two-parent home	-.021	.078	.793
Oldest child	**.125**	**.046**	**.006**
Parent use: 1-2 visits[c]	**.261**	**.086**	**.003**
Parent use: 3-6 visits[c]	**.415**	**.092**	**<.001**
Parent use: >6 visits[c]	**.436**	**.092**	**<.001**
Child health: good[d]	-.045	.147	.762
Child health: very good[d]	-.104	.138	.453
Child health: excellent[d]	-.133	.133	.318
Child has limitation	.142	.107	.183
Child race: African American[e]	-.065	.090	.473
Child race: other[e]	-.021	.096	.826
Child race: Hispanic[e]	-.020	.093	.835
Family income: 100%-124% FPL[f]	.120	.134	.371
Family income: 125%-199% FPL[f]	-.015	.108	.889
Family income: 200%-399% FPL[f]	.080	.120	.505
Family income: ≥400% FPL[f]	**.321**	**.142**	**.024**
Metropolitan Statistical Area	**.271**	**.086**	**.002**
Region: Midwest[g]	**-.295**	**.100**	**.003**
Region: South[g]	**-.389**	**.096**	**<.001**
Region: West[g]	**-.521**	**.101**	**<.001**
Parent worry: worried[h]	.095	.064	.143
Parent worry: don't know[h]	-.034	.114	.764
Female parent	**.469**	**.169**	**.006**
Parent education: high school[i]	-.026	.096	.784
Parent education: bachelor's degree[i]	.099	.115	.393
Parent education: graduate degree[i]	.252	.134	.060
Parent education: other degree[i]	.023	.122	.853
Comfort w/English	.252	.141	.074
Parent employment: part time[j]	**-.192**	**.078**	**.014**
Parent employment: full time[j]	-.118	.076	.121
Parent risk aversion: risk neutral[k]	.024	.063	.697
Parent risk aversion: risk loving[k]	-.171	.158	.280
Parent self-care expectation: neutral[l]	.039	.062	.528

Table A12. Continued

Parent self-care expectation: positive[l]	-.153	.186	.411
Constant	-.048	.383	.900
Parental insurance coverage			
Parental eligibility for insurance	**.805**	**.127**	**<.001**
Child age (yrs)	-.012	.009	.157
Number of children	.067	.055	.220
Parent physical health score (PCS-12)	-.012	.006	.060
Parent mental health score (MCS-12)	-.006	.005	.189
Child insurance: private[b]	**1.638**	**.193**	**<.001**
Child insurance: other public[b]	**.766**	**.261**	**.004**
Child insurance: multiple sources[b]	.385	.248	.121
Two-parent home	.029	.131	.827
Oldest child	.119	.063	.058
Parent use: 1-2 visits[c]	**.397**	**.127**	**.002**
Parent use: 3-6 visits[c]	**.673**	**.150**	**<.001**
Parent use: >6 visits[c]	**.627**	**.171**	**<.001**
Child health: good[d]	.204	.196	.300
Child health: very good[d]	.373	.204	.069
Child health: excellent[d]	.177	.207	.393
Child has limitation	-.047	.170	.785
Child race: African American[e]	**.496**	**.172**	**.004**
Child race: other[e]	.287	.206	.164
Child race: Hispanic[e]	-.071	.148	.633
Family income: 100%-124% FPL[f]	.195	.182	.285
Family income: 125%-199% FPL[f]	-.092	.141	.514
Family income: 200%-399% FPL[f]	.258	.208	.217
Family income: ≥400% FPL[f]	**.856**	**.308**	**.006**
Metropolitan Statistical Area	.006	.158	.968
Region: Midwest[g]	**-.708**	**.273**	**.010**
Region: South[g]	**-1.086**	**.250**	**<.001**
Region: West[g]	-.394	.251	.117
Parent worry: worried[h]	-.023	.099	.817
Parent worry: don't know[h]	-.258	.193	.182
Female parent	.540	.445	.225
Parent education: high school[i]	-.254	.141	.071
Parent education: bachelor's degree[i]	-.056	.223	.802
Parent education: graduate degree[i]	**.776**	**.338**	**.022**
Parent education: other degree[i]	-.264	.233	.258
Comfort w/English	**.702**	**.155**	**<.001**
Parent employment: part time[j]	.165	.147	.264
Parent employment: full time[j]	.155	.129	.232
Parent risk aversion: risk neutral[k]	**-.246**	**.114**	**.031**
Parent risk aversion: risk loving[k]	-.383	.197	.052
Parent self care expectation: neutral[l]	.0006	.110	.995

Table A12. Continued

Parent self care expectation: positive[l]	-.098	.214	.646
Constant	.086	.665	.897

Model fit: $F(84, 337) = 10.43$, $p<.001$

[a]Coefficients from bivariate probit model predicting well-child visit: no visit=0, visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

APPENDIX B. SUPPLEMENTAL ANALYSES FOR AT LEAST ONE ASTHMA-RELATED PHYSICIAN VISIT

Table B1 displays the correlation coefficients between the variables included in the asthma visit models. Table B2 presents the results of the probit analysis for at least one asthma-related physician visit with the parent health care utilization variable dropped. Table B3 displays the variance inflation factors from the linear probability model for at least one asthma-related visit. Tables B4-B7 contain the bivariate probit results for having at least one asthma-related physician visit. There is one table for each of the four instruments. In these tables, bold-face type indicates significance at the α=0.05 level.

Table B1. Correlations Between Variables Included in Asthma Visit Models (N=559)

	≥1 asthma visit	≥2 asthma visits	Insured	Age	# kids	Physical health	Mental health	Medicaid/ other pub	Medicaid
≥1 asthma visit	1								
≥2 asthma visits	**.64**	1							
Insured	-.02	.003	1						
Age	**-.11**	-.06	.01	1					
# kids	-.03	**-.08**	-.04	-.04	1				
Physical health	-.07	-.05	.01	-.07	.03	1			
Mental health	.01	-.02	.01	.04	**-.09**	**.12**	1		
Medicaid/ other pub	-.01	-.01	**-.38**	**-.15**	**.23**	**-.21**	**-.21**	1	
Medicaid	-.02	-.02	**-.39**	**-.15**	**.24**	**-.22**	**-.22**	**.98**	1
Other pub	.01	.05	.05	-.03	-.06	.04	.04	**.10**	**-.10**
Private	.004	.01	**.37**	**.16**	**-.23**	**.23**	**.19**	**-.94**	**-.92**
Multiple	.03	-.01	.05	-.02	-.01	-.06	.07	**-.17**	**-.17**
2 parents	.07	.02	**.11**	**.09**	-.02	**.10**	**.17**	**-.42**	**-.43**
Oldest kid	.03	.03	.05	**.16**	**-.42**	.03	.06	**-.08**	**-.10**
No visits	-.06	-.07	**-.31**	.07	**.20**	**.08**	.08	**.18**	**.19**
1-2 visits	-.06	-.05	.02	-.03	-.07	**.15**	.02	-.08	-.08
3-6 visits	**.09**	.02	**.10**	-.02	-.02	-.08	.04	-.02	-.03
>6 visits	.02	**.10**	**.17**	-.02	**-.10**	**-.15**	**-.14**	-.08	-.06
Poor/fair	**.18**	**.19**	**-.10**	**-.11**	.04	-.02	**-.12**	**.16**	**.15**
Good	.07	.03	.003	-.08	-.01	-.07	-.01	.03	.04
Very good	-.03	-.005	**.08**	**.09**	-.03	.03	.01	-.03	-.04
Excellent	**-.15**	**-.14**	-.02	.06	.01	.05	.08	**-.10**	**-.09**
Limitation	**.18**	**.19**	-.03	.03	.03	-.08	**-.10**	**.15**	**.14**
White	.08	.06	**.12**	.07	**-.19**	**.11**	.01	**-.38**	**-.38**
Black	**-.11**	**-.12**	-.03	-.08	.05	-.05	.06	**.20**	**.20**
Other	-.002	.05	.06	-.02	.001	.003	**-.09**	.04	.05
Hispanic	.03	.01	**-.14**	.01	**.15**	-.08	-.01	**.19**	**.18**
<100% FPL	-.01	-.02	**-.15**	**-.14**	**.30**	**-.20**	**-.25**	**.55**	**.57**
100-124% FPL	-.01	-.004	**-.13**	-.08	**.11**	.04	.01	**.18**	**.19**
125-199% FPL	-.002	.01	**-.11**	.01	-.06	**-.11**	.01	**.11**	**.11**
200-399% FPL	-.01	.02	**.15**	**.11**	**-.11**	**.11**	**.11**	**-.38**	**-.39**
≥400% FPL	.03	.01	**.20**	**.09**	**-.25**	**.20**	**.16**	**-.45**	**-.46**
MSA	.002	-.02	.08	.06	**-.13**	-.06	**.16**	**-.10**	**-.11**
Northeast	**.11**	**.13**	**.13**	-.003	-.04	-.04	.04	.01	.02
Midwest	-.002	-.005	.08	.0002	-.02	.02	-.05	**-.11**	**-.09**
South	-.03	-.06	**-.18**	-.04	**.13**	.08	-.01	**.09**	.08
West	-.05	-.03	.02	.05	**-.09**	-.07	.03	-.01	-.01

Table B1. Continued

	≥1 asthma visit	≥2 asthma visits	Insured	Age	# kids	Physical health	Mental health	Medicaid/ other pub	Medicaid
No worry	**-.14**	**-.10**	**.11**	**.09**	-.03	**.13**	**.14**	**-.14**	**-.14**
Worried	**.11**	**.10**	-.07	-.07	.08	**-.13**	**-.13**	**.15**	**.15**
Don't know	.07	.01	-.08	-.04	**-.09**	-.002	-.02	-.02	-.01
No high schl	-.05	-.04	-.02	**-.09**	**.27**	-.01	**-.13**	**.35**	**.36**
High school	-.03	-.02	**-.17**	-.01	-.05	**-.15**	-.01	**.16**	**.16**
Bachelor's	**.18**	**.13**	**.14**	.03	**-.10**	.07	**.10**	**-.32**	**-.33**
Grad degree	-.04	-.02	**.09**	.02	**-.09**	**.11**	.06	**-.23**	**-.24**
Other degree	-.04	-.03	.06	.07	-.07	.08	.02	**-.13**	**-.14**
English	-.04	-.01	**.28**	.03	-.02	-.02	-.02	**-.20**	**-.21**
Unemployed	.03	.06	-.01	**-.08**	**.25**	**-.18**	**-.10**	**.28**	**.27**
Part time	.05	.04	-.02	.06	**-.10**	.04	-.04	.02	.03
Full time	-.08	**-.09**	.03	.03	**-.16**	**.15**	**.13**	**-.30**	**-.30**
Risk averse	-.03	.003	.05	**.08**	-.07	.04	.04	-.02	-.03
Risk neutral	.03	.01	-.01	-.06	**.09**	-.02	**-.09**	.01	.02
Risk loving	.01	-.04	**-.09**	-.04	-.05	-.06	**.10**	.02	.03
Negative	-.01	.03	**.11**	.01	.07	**-.17**	**-.09**	.06	.05
Neutral/ positive	.01	-.03	**-.11**	-.01	-.07	**.17**	**.09**	-.06	-.05
Neutral	.01	-.003	**-.10**	-.02	**-.12**	**.14**	.06	**-.08**	**-.08**
Positive	.005	-.07	-.01	.01	**.16**	.08	.07	**.08**	**.09**

	Other pub	Private	Multiple	2 parents	Oldest kid	No visits	1-2 visists	3-6 visits	>6 visits
Other pub	1								
Private	**-.10**	1							
Multiple	-.02	**-.16**	1						
2 parents	.05	**.41**	.01	1					
Oldest kid	**.09**	.07	.03	-.02	1				
No visits	-.01	**-.21**	.06	-.01	**-.09**	1			
1-2 visits	.02	**.09**	-.03	-.02	.02	**-.31**	1		
3-6 visits	.05	.02	.02	-.04	.02	**-.33**	**-.36**	1	
>6 visits	-.06	**.09**	-.05	.07	.05	**-.31**	**-.34**	**-.35**	1
Poor/fair	.03	**-.17**	.02	-.06	.01	-.02	.02	-.02	.02
Good	-.03	-.05	.06	**-.08**	-.01	-.03	.01	.03	-.01
Very good	.04	.03	-.002	.07	.01	-.05	**-.10**	.07	.08
Excellent	-.03	**.12**	-.07	.05	-.002	**.09**	.08	**-.09**	-.08
Limitation	.02	**-.16**	.04	-.04	.08	-.01	-.05	.03	.03
White	-.01	**.39**	-.03	**.29**	**.09**	**-.15**	**-.10**	.01	**.23**

Table B1. Continued

	Other pub	Private	Multiple	2 parents	Oldest kid	No visits	1-2 visists	3-6 visits	>6 visits
Black	.02	**-.24**	**.09**	**-.32**	-.06	.05	.04	.01	**-.10**
Other	-.03	-.03	-.05	-.04	.003	-.07	.07	.06	-.07
Hispanic	.02	**-.18**	-.03	.02	-.04	**.16**	.02	-.06	**-.11**
<100% FPL	-.07	**-.56**	.02	**-.42**	**-.10**	**.15**	**-.08**	-.001	-.06
100-124% FPL	-.03	**-.18**	-.0001	.06	-.04	.02	-.02	-.08	.07
125-199% FPL	-.002	**-.11**	-.02	-.05	.04	.05	-.02	.03	-.06
200-399% FPL	.06	**.37**	.02	**.21**	.05	**-.10**	**.10**	.003	-.003
≥400% FPL	.04	**.46**	-.03	**.27**	.06	**-.13**	.02	.02	**.09**
MSA	.04	**.10**	.01	.05	**.09**	-.06	**.13**	-.06	-.02
Northeast	-.04	-.01	.02	-.04	-.02	-.04	-.02	.01	.05
Midwest	-.05	**.09**	.04	.06	.05	**-.08**	.05	-.02	.05
South	**.09**	**-.10**	.01	**-.09**	-.04	**.09**	.003	.001	**-.09**
West	-.02	.04	-.07	.08	.01	.01	-.03	.01	.01
No worry	-.001	**.13**	.02	.05	-.02	-.07	.06	.06	-.06
Worried	.01	**-.15**	-.02	-.06	-.03	**.09**	-.06	-.04	.01
Don't know	-.03	.02	-.004	.02	**.09**	-.04	-.01	-.04	**.09**
No high schl	-.05	**-.33**	-.05	-.04	**-.14**	**.12**	.005	**-.08**	-.04
High school	-.03	**-.18**	.07	**-.19**	.01	.04	-.05	.01	.01
Bachelor's	.01	**.34**	-.04	**.21**	.08	-.07	-.02	.05	.03
Grad degree	.04	**.25**	-.05	**.15**	.02	**-.09**	.003	-.01	**.09**
Other degree	.07	**.12**	.03	-.004	.06	-.06	**.09**	.03	-.06
English	.03	**.19**	.05	-.01	-.03	**-.14**	-.02	.07	**.09**
Unemployed	.03	**-.28**	.02	-.08	-.05	.02	-.02	.03	-.03
Part time	-.02	-.004	-.06	.07	.05	-.08	.04	-.01	.05
Full time	-.003	**.29**	.03	.02	.01	.05	-.02	-.02	-.01
Risk averse	.04	.03	-.03	.07	.02	**-.12**	.03	.02	.06
Risk neutral	-.03	-.02	.02	-.05	-.001	**.11**	-.005	-.03	-.08
Risk loving	-.03	-.02	.01	-.04	-.03	.002	-.05	.01	.04
Negative	.01	-.06	.01	.02	-.06	-.08	-.05	**.11**	.02
Neutral/ positive	-.01	.06	-.01	-.02	.06	.08	.05	**-.11**	-.02
Neutral	-.002	**.09**	-.003	-.02	.07	.06	.02	-.08	.001
Positive	-.02	-.07	-.03	-.01	-.02	.06	**.10**	**-.10**	-.05
	Poor/fair	Good	Very good	Excellent	Limitation	White	Black	Other	Hispanic
Poor/fair	1								
Good	**-.20**	1							

Table B1. Continued

	Poor/fair	Good	Very good	Excellent	Limitation	White	Black	Other	Hispanic
Very good	**-.21**	**-.43**	1						
Excellent	**-.21**	**-.42**	**-.46**	1					
Limitation	**.15**	**.11**	-.07	**-.12**	1				
White	-.05	-.07	**.09**	.01	-.06	1			
Black	.06	.01	**-.09**	.04	.005	**-.48**	1		
Other	-.07	**.11**	-.05	-.01	**.10**	**-.24**	**-.18**	1	
Hispanic	.04	.002	.03	-.05	-.004	**-.47**	**-.36**	**-.18**	1
<100% FPL	.07	.06	-.06	-.04	.03	**-.25**	**.16**	.07	.07
100-124% FPL	**.10**	-.02	.03	-.08	.05	-.02	**-.09**	.002	**.11**
125-199% FPL	.02	-.02	-.01	.01	.05	**-.17**	**.14**	-.07	**.09**
200-399% FPL	-.06	.04	.02	-.03	-.04	**.13**	-.06	-.08	-.04
≥400% FPL	**-.10**	**-.09**	.04	**.11**	-.07	**.32**	**-.21**	.07	**-.19**
MSA	-.004	-.05	-.02	.07	-.07	**-.11**	.08	-.03	.05
Northeast	-.01	-.04	.01	.04	-.04	.05	-.001	-.04	-.03
Midwest	.01	-.01	-.02	.03	.07	**.18**	-.01	.03	**-.21**
South	.01	.02	.01	-.03	.002	**-.11**	**.22**	**-.09**	-.04
West	-.01	.02	.01	-.02	-.04	**-.08**	**-.24**	**.10**	**.27**
No worry	**-.20**	-.07	.004	**.19**	**-.18**	**.09**	.05	-.02	**-.14**
Worried	**.17**	**.09**	-.04	**-.16**	**.15**	**-.17**	-.003	.02	**.17**
Don't know	.06	-.04	.07	-.07	.06	**.15**	**-.10**	-.01	-.06
No high schl	**.13**	-.003	-.01	-.07	-.01	**-.21**	**-.09**	-.06	**.36**
High school	.04	.06	**-.08**	.01	.01	**-.12**	**.24**	.03	**-.13**
Bachelor's	-.07	-.03	**.09**	-.02	.03	**.23**	**-.14**	-.01	**-.10**
Grad degree	-.07	-.06	.02	.07	-.06	**.15**	**-.13**	.06	-.08
Other degree	-.08	-.01	.02	.03	.01	.06	-.01	-.02	-.05
English	**-.15**	.01	-.01	**.09**	-.03	**.21**	**.16**	.06	**-.43**
Unemployed	.03	**.11**	-.05	-.08	.02	-.06	**-.10**	.07	**.13**
Part time	**.09**	-.08	.05	-.03	.03	.02	.04	-.04	-.04
Full time	**-.11**	-.04	-.001	**.11**	-.04	.04	.07	-.03	**-.09**
Risk averse	-.06	**-.09**	.06	.06	-.01	.07	.06	-.04	**-.10**
Risk neutral	.06	.06	-.08	-.02	.04	-.05	-.04	.03	.08
Risk loving	.01	.06	.04	**-.09**	-.06	-.03	-.04	.04	.05
Negative	-.05	.06	-.04	.01	.06	-.08	.06	.004	.02
Neutral/ positive	.05	-.06	.04	-.01	-.06	.08	-.06	-.004	-.02
Neutral	.06	-.04	.02	-.01	-.05	**.11**	-.06	-.01	-.06
Positive	-.02	-.06	.07	.02	-.03	**-.11**	-.01	.03	**.12**

Table B1. Continued

	<100% FPL	100-124% FPL	125-199% FPL	200-399% FPL	≥400% FPL	MSA	Northeast	Midwest	South
<100% FPL	1								
100-124% FPL	**-.18**	1							
125-199% FPL	**-.31**	**-.12**	1						
200-399% FPL	**-.40**	**-.15**	**-.27**	1					
≥400% FPL	**-.33**	**-.12**	**-.22**	**-.28**	1				
MSA	**-.11**	**-.11**	.001	**.10**	**.09**	1			
Northeast	.03	.03	-.03	-.06	.04	**.09**	1		
Midwest	-.02	-.08	-.03	.04	.05	-.05	**-.22**	1	
South	.03	-.0004	.01	.03	-.08	**-.13**	**-.35**	**-.42**	1
West	-.04	.05	.03	-.02	.02	**.12**	**-.24**	**-.29**	**-.45**
No worry	**-.09**	**-.14**	-.01	.02	**.18**	**.10**	-.01	.06	.003
Worried	**.12**	**.13**	.01	-.02	**-.21**	**-.10**	.03	-.06	-.001
Don't know	-.05	.02	-.01	.001	.05	-.002	-.04	-.02	-.003
No high schl	**.32**	**.18**	**-.11**	**-.16**	**-.22**	-.06	.05	**-.10**	-.05
High school	**.11**	-.03	**.18**	-.05	**-.24**	**-.09**	.04	.01	.04
Bachelor's	**-.26**	-.08	**-.08**	**.14**	**.28**	**.14**	-.02	-.03	.03
Grad degree	**-.19**	-.07	-.06	.02	**.32**	-.01	-.07	**.12**	-.07
Other degree	**-.13**	-.03	-.01	**.10**	.07	.07	-.05	.03	.03
English	-.04	**-.12**	-.05	.05	**.12**	-.07	.07	**.11**	.04
Unemployed	**.36**	.07	**-.16**	**-.10**	**-.21**	-.03	.02	.004	**-.09**
Part time	**-.10**	.01	**.16**	-.02	-.01	.02	.02	.004	-.06
Full time	**-.27**	-.08	.01	**.12**	**.23**	.01	-.04	-.01	**.14**
Risk averse	-.01	-.01	-.03	.01	.04	.04	.03	.03	-.06
Risk neutral	.02	.04	.03	.01	**-.09**	-.04	-.04	-.01	.05
Risk loving	-.01	-.06	-.01	-.04	**.11**	-.004	.03	-.03	.04
Negative	**.11**	-.03	-.05	-.04	-.03	.02	.02	.01	-.03
Neutral/ positive	**-.11**	.03	.05	.04	.03	-.02	-.02	-.01	.03
Neutral	**-.12**	-.01	.06	.06	.02	-.03	-.02	-.01	.02
Positive	.03	**.13**	-.05	-.08	.03	.01	-.01	.02	.03
	West	No worry	Worried	Don't know	No high school	High school	Bachelor's	Graduate degree	Other degree
West	1								
No worry	-.05	1							
Worried	.03	**-.87**	1						
Don't know	.05	**-.27**	**-.23**	1					
No high schl	**.11**	-.08	**.10**	-.04	1				

Table B1. Continued

	West	No worry	Worried	Don't know	No high school	High school	Bachelor's	Graduate degree	Other degree
High school	**-.09**	**-.09**	.08	.02	**-.46**	1			
Bachelor's	.02	.05	-.07	.04	**-.19**	**-.38**	1		
Grad degree	.02	.08	**-.10**	.03	**-.14**	**-.28**	**-.11**	1	
Other degree	-.02	**.12**	**-.09**	-.06	**-.18**	**-.36**	**-.15**	**-.11**	1
English	-.21	**.12**	**-.12**	-.004	**-.34**	**.14**	.07	.03	**.09**
Unemployed	**.08**	**-.13**	**.16**	-.07	**.29**	.01	**-.13**	**-.15**	**-.10**
Part time	.05	-.03	.01	.04	**-.10**	.07	.02	-.01	-.01
Full time	**-.12**	**.16**	**-.17**	.03	**-.20**	-.08	**.11**	**.16**	**.11**
Risk averse	.03	**.10**	-.08	-.05	-.06	.01	-.01	.03	.05
Risk neutral	-.01	**-.11**	**.10**	.02	.05	.02	.003	-.05	-.05
Risk loving	-.04	.01	-.04	.06	.03	-.06	.02	.05	.004
Negative	.01	-.01	.05	-.06	.02	.07	-.02	.01	**-.12**
Neutral/ positive	-.01	.01	-.05	.06	-.02	-.07	.02	-.01	**.12**
Neutral	.01	.01	-.04	.05	-.06	-.04	.03	-.02	**.12**
Positive	-.04	-.001	-.02	.04	**.11**	-.08	-.04	.03	.001

	Enlgish	Unemployed	Part time	Full time	Risk averse	Risk neutral	Risk loving	Negative	Neutral/ positive
English	1								
Unemployed	**-.10**	1							
Part time	.07	**-.48**	1						
Full time	.04	**-.57**	**-.45**	1					
Risk averse	**.10**	.03	.02	-.05	1				
Risk neutral	-.05	-.03	.02	.02	**-.89**	1			
Risk loving	**-.11**	.003	-.08	.07	**-.22**	**-.24**	1		
Negative	.02	**.16**	**-.18**	.01	**.21**	**-.18**	-.05	1	
Neutral/ positive	-.02	**-.16**	**.18**	-.01	**-.21**	**.18**	.05	-1	1
Neutral	.02	**-.17**	**.19**	-.003	**-.18**	**.20**	-.03	**-.94**	**.94**
Positive	**-.11**	.04	-.03	-.01	-.07	-.04	**.24**	**-.16**	**.16**

	Neutral	Positive
Neutral	1	
Positive	**-.18**	1

Table B2. Coefficients and Marginal Effects from Probit Model Predicting Whether Child had at Least One Asthma-Related Physician Visit that Does Not Include ParentalHealth Care Utilization (N=559)

Variable	b[a]	SE	p	Marginal effects
Parent insured	-.305	.249	.222	-.10
Child age (yrs)	**-.044**	**.018**	**.013**	**-.01**
Number of children	-.027	.068	.687	-.01
Parent physical health score (PCS-12)	-.011	.009	.212	-.004
Parent mental health score (MCS-12)	.008	.007	.254	.003
Child insurance: private[b]	-.012	.248	.961	.001
Child insurance: multiple sources[b]	-.471	.402	.242	-.15
Two-parent home	.370	.201	.067	.07
Oldest child	.003	.156	.987	.01
Child health: good[c]	-.300	.272	.272	-.08
Child health: very good[c]	**-.759**	**.281**	**.007**	**-.24**
Child health: excellent[c]	**-.740**	**.286**	**.010**	**-.23**
Child has limitation	.327	.235	.166	.12
Child race: African American[d]	-.195	.215	.366	-.08
Child race: other[d]	-.196	.259	.449	-.08
Child race: Hispanic[d]	.058	.224	.796	.02
Family income: 100%-124% FPL[e]	**-.682**	**.337**	**.044**	**-.20**
Family income: 125%-199% FPL[e]	-.187	.232	.422	-.05
Family income: 200%-399% FPL[e]	-.178	.257	.489	-.04
Family income: ≥400% FPL[e]	-.138	.301	.646	-.01
Metropolitan Statistical Area	-.048	.220	.829	-.01
Region: Midwest[f]	-.349	.226	.123	-.10
Region: South[f]	-.405	.208	.052	-.12
Region: West[f]	**-.827**	**.211**	**<.001**	**-.25**
Parent worry: worried[g]	.233	.156	.135	.06
Parent worry: don't know[g]	**.582**	**.248**	**.020**	**.17**
Parent education: high school[h]	.247	.261	.345	.07
Parent education: bachelor's degree[h]	**1.084**	**.330**	**.001**	**.34**
Parent education: graduate degree[h]	.695	.356	.052	.19
Parent education: other degree[h]	.440	.314	.162	.12
Comfort w/English	-.023	.334	.945	-.01
Parent employment: part time[i]	-.018	.182	.921	-.0003
Parent employment: full time[i]	**-.464**	**.183**	**.011**	**-.13**
Parent risk aversion: risk neutral[j]	-.0003	.158	.998	.01
Parent risk aversion: risk loving[j]	-.280	.398	.481	-.08
Parent self-care expectation: neutral[k]	.001	.167	.994	-.004
Parent self-care expectation: positive[k]	.691	.469	.142	.21
Constant	.872	.766	.256	

Model fit: $F(37, 249)=2.67$, $p<.001$

Table B2. Continued

[a]Coefficients from probit model predicting whether child has at least one asthma-related physician visit: no visits=0, at least one visit=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Child health: fair/poor

[d]Reference category: Child race/ethnicity: Caucasian

[e]Reference category: Family income: <100% FPL

[f]Reference category: Region: Northeast

[g]Reference category: Parent worry: not worried

[h]Reference category: Parent education: No high school diploma or GED

[i]Reference category: Parent employment: not working

[j]Reference category: Parent risk aversion: risk averse

[k]Reference category: Parent self care expectation: negative

Table B3. Variance Inflation Factors (VIFs) from Linear Probability Model Predicting at Least One Asthma-Related Physician Visit (N=559)

Variable	VIF
Family income: ≥400% FPL	5.93
Child health: excellent	4.75
Child health: very good	4.71
Child health: good	4.17
Family income: 200%-399% FPL	4.08
Parent education: high school	4.06
Parent education: bachelor's degree	3.87
Child insurance: private	3.34
Parent education: other degree	3.33
Parent education: graduate degree	2.90
Parent use: >6 visits	2.34
Region: South	2.26
Parent use: 3-6 visits	2.11
Parent use: 1-2 visits	2.01
Parent employment: full time	1.99
Region: Midwest	1.93
Region: West	1.92
Family income: 125%-199% FPL	1.88
Parent employment: part time	1.73
Number of children	1.72
Child race: African American	1.71
Two-parent home	1.65
Child race: Hispanic	1.65
Parent insured	1.56
Comfort w/English	1.46
Parent self-care expectation: positive	1.45
Parent risk aversion: risk loving	1.45
Oldest child	1.40
Parent physical health score (PCS-12)	1.35
Parent worry: worried	1.29
Family income: 100%-124% FPL	1.27
Metropolitan Statistical Area	1.27
Child race: other	1.27
Parent self-care expectation: neutral	1.26
Parent mental health score (MCS-12)	1.26
Parent risk aversion: risk neutral	1.22
Child age (yrs)	1.20
Parent worry: don't know	1.17
Child insurance: multiple sources	1.16
Child has limitation	1.15

Table B4. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least One Asthma-Related Physician Visit and Parental Insurance Coverage with *Low* Instrumental Variable (N=559)

Variable	b[a]	SE	P
Well-child visit			
Parent insured	.413	.701	.556
Child age (yrs)	**-.040**	**.018**	**.025**
Number of children	-.027	.068	.690
Parent physical health score (PCS-12)	-.010	.009	.301
Parent mental health score (MCS-12)	.005	.008	.511
Child insurance: private[b]	-.265	.363	.466
Child insurance: multiple sources[b]	-.671	.458	.144
Two-parent home	**.391**	**.197**	**.048**
Oldest child	-.041	.157	.793
Parent use: 1-2 visits[c]	-.321	.270	.235
Parent use: 3-6 visits[c]	.122	.266	.647
Parent use: >6 visits[c]	-.238	.297	.424
Child health: good[d]	-.286	.257	.267
Child health: very good[d]	**-.761**	**.263**	**.004**
Child health: excellent[d]	**-.654**	**.264**	**.014**
Child has limitation	.288	.232	.215
Child race: African American[e]	-.231	.219	.293
Child race: other[e]	-.298	.254	.242
Child race: Hispanic[e]	.034	.222	.879
Family income: 100%-124% FPL[f]	-.445	.395	.261
Family income: 125%-199% FPL[f]	-.097	.239	.685
Family income: 200%-399% FPL[f]	-.060	.271	.825
Family income: ≥400% FPL[f]	-.031	.306	.920
Metropolitan Statistical Area	-.020	.219	.927
Region: Midwest[g]	-.269	.231	.245
Region: South[g]	-.326	.223	.146
Region: West[g]	**-.782**	**.227**	**.001**
Parent worry: worried[h]	.278	.156	.076
Parent worry: don't know[h]	**.648**	**.237**	**.007**
Parent education: high school[i]	.379	.283	.182
Parent education: bachelor's degree[i]	**1.120**	**.339**	**.001**
Parent education: graduate degree[i]	**.761**	**.358**	**.034**
Parent education: other degree[i]	.480	.323	.138
Comfort w/English	-.234	.375	.534
Parent employment: part time[j]	-.048	.186	.798
Parent employment: full time[j]	**-.469**	**.186**	**.012**
Parent risk aversion: risk neutral[k]	.018	.157	.911
Parent risk aversion: risk loving[k]	-.220	.418	.599
Parent self-care expectation: neutral[l]	.106	.178	.553
Parent self-care expectation: positive[l]	.910	.492	.065

Table B4. Continued

Constant	.414	.876	.637
Parental insurance coverage			
Parental eligibility for insurance	**.840**	**.274**	**.002**
Child age (yrs)	-.029	.022	.174
Number of children	.139	.093	.138
Parent physical health score (PCS-12)	.006	.011	.550
Parent mental health score (MCS-12)	.006	.009	.531
Child insurance: private[b]	**2.028**	**.470**	**<.001**
Child insurance: multiple sources[b]	**1.346**	**.551**	**.015**
Two-parent home	-.138	.229	.547
Oldest child	**.447**	**.198**	**.025**
Parent use: 1-2 visits[c]	**.947**	**.387**	**.015**
Parent use: 3-6 visits[c]	**.963**	**.265**	**<.001**
Parent use: >6 visits[c]	**1.422**	**.364**	**<.001**
Child health: good[d]	.160	.335	.634
Child health: very good[d]	**.983**	**.367**	**.008**
Child health: excellent[d]	-.167	.344	.628
Child has limitation	.063	.275	.820
Child race: African American[e]	.613	.331	.066
Child race: other[e]	.740	.453	.104
Child race: Hispanic[e]	.112	.337	.739
Family income: 100%-124% FPL[f]	-.536	.441	.225
Family income: 125%-199% FPL[f]	-.401	.314	.203
Family income: 200%-399% FPL[f]	-.393	.426	.358
Family income: ≥400% FPL[f]	.184	.636	.772
Metropolitan Statistical Area	.257	.264	.331
Region: Midwest[g]	-.782	.451	.084
Region: South[g]	**-.999**	**.356**	**.005**
Region: West[g]	-.415	.417	.320
Parent worry: worried[h]	-.294	.235	.213
Parent worry: don't know[h]	-.737	.408	.072
Parent education: high school[i]	**-.706**	**.319**	**.028**
Parent education: bachelor's degree[i]	.254	.533	.634
Parent education: graduate degree[i]	-.136	.562	.809
Parent education: other degree[i]	-.646	.447	.149
Comfort w/English	**1.226**	**.351**	**.001**
Parent employment: part time[j]	.097	.281	.730
Parent employment: full time[j]	-.140	.337	.679
Parent risk aversion: risk neutral[k]	.224	.202	.270
Parent risk aversion: risk loving[k]	-.323	.479	.502
Parent self-care expectation: neutral[l]	**-.773**	**.248**	**.002**
Parent self-care expectation: positive[l]	-.553	.577	.339
Constant	-1.176	1.208	.331

Model fit: $F(80,206) = 4.05$, $p<.001$

Table B4. Continued

[a]Coefficients from bivariate probit model predicting at least one asthma-related physician visit: no visits=0, at least one visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

Table B5. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least One Asthma-Related Physician Visit and Parental Insurance Coverage with *Median* Instrumental Variable (N=559)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	.339	.698	.628
Child age (yrs)	**-.041**	**.018**	**.023**
Number of children	-.028	.069	.686
Parent physical health score (PCS-12)	-.010	.009	.300
Parent mental health score (MCS-12)	.005	.008	.497
Child insurance: private[b]	-.236	.357	.509
Child insurance: multiple sources[b]	-.652	.463	.161
Two-parent home	**.390**	**.198**	**.049**
Oldest child	-.038	.157	.811
Parent use: 1-2 visits[c]	-.311	.270	.250
Parent use: 3-6 visits[c]	.135	.264	.610
Parent use: >6 visits[c]	-.222	.296	.452
Child health: good[d]	-.287	.258	.267
Child health: very good[d]	**-.761**	**.264**	**.004**
Child health: excellent[d]	**-.660**	**.265**	**.013**
Child has limitation	.293	.233	.209
Child race: African American[e]	-.228	.218	.297
Child race: other[e]	-.290	.254	.255
Child race: Hispanic[e]	.038	.223	.863
Family income: 100%-124% FPL[f]	-.465	.394	.239
Family income: 125%-199% FPL[f]	-.103	.239	.667
Family income: 200%-399% FPL[f]	-.067	.271	.804
Family income: ≥400% FPL[f]	-.038	.306	.902
Metropolitan Statistical Area	-.015	.219	.945
Region: Midwest[g]	-.277	.230	.231
Region: South[g]	-.336	.221	.130
Region: West[g]	**-.793**	**.224**	**<.001**
Parent worry: worried[h]	.274	.157	.081
Parent worry: don't know[h]	**.643**	**.239**	**.008**
Parent education: high school[i]	.364	.286	.204
Parent education: bachelor's degree[i]	**1.110**	**.342**	**.001**
Parent education: graduate degree[i]	**.750**	**.361**	**.039**
Parent education: other degree[i]	.470	.326	.151
Comfort w/English	-.205	.377	.586
Parent employment: part time[j]	-.048	.186	.798
Parent employment: full time[j]	**-.472**	**.186**	**.012**
Parent risk aversion: risk neutral[k]	.017	.157	.915
Parent risk aversion: risk loving[k]	-.229	.417	.584
Parent self-care expectation: neutral[l]	.099	.177	.578
Parent self-care expectation: positive[l]	.912	.489	.063

Table B5. Continued

Constant	.446	.882	.614
Parental insurance coverage			
Parental eligibility for insurance	.791	.236	.001
Child age (yrs)	-.034	.022	.131
Number of children	.160	.094	.089
Parent physical health score (PCS-12)	.006	.011	.583
Parent mental health score (MCS-12)	.002	.010	.815
Child insurance: private[b]	**2.095**	**.446**	**<.001**
Child insurance: multiple sources[b]	**1.471**	**.566**	**.010**
Two-parent home	-.113	.231	.624
Oldest child	**.509**	**.206**	**.014**
Parent use: 1-2 visits[c]	.864	.391	.028
Parent use: 3-6 visits[c]	**.930**	**.264**	**<.001**
Parent use: >6 visits[c]	**1.359**	**.375**	**<.001**
Child health: good[d]	.129	.335	.700
Child health: very good[d]	**.971**	**.365**	**.008**
Child health: excellent[d]	-.138	.351	.695
Child has limitation	.153	.268	.568
Child race: African American[e]	.638	.321	.048
Child race: other[e]	.771	.463	.097
Child race: Hispanic[e]	.113	.343	.742
Family income: 100%-124% FPL[f]	-.324	.448	.470
Family income: 125%-199% FPL[f]	-.250	.326	.445
Family income: 200%-399% FPL[f]	-.186	.461	.687
Family income: ≥400% FPL[f]	.365	.640	.568
Metropolitan Statistical Area	.263	.280	.349
Region: Midwest[g]	-.891	.471	.060
Region: South[g]	**-.957**	**.357**	**.008**
Region: West[g]	-.450	.408	.271
Parent worry: worried[h]	-.275	.243	.259
Parent worry: don't know[h]	-.753	.428	.079
Parent education: high school[i]	**-.724**	**.338**	**.033**
Parent education: bachelor's degree[i]	**.191**	**.546**	**.727**
Parent education: graduate degree[i]	-.162	.576	.779
Parent education: other degree[i]	-.647	.445	.147
Comfort w/English	**1.249**	**.351**	**<.001**
Parent employment: part time[j]	.234	.285	.413
Parent employment: full time[j]	-.076	.327	.817
Parent risk aversion: risk neutral[k]	.242	.204	.237
Parent risk aversion: risk loving[k]	-.222	.469	.637
Parent self-care expectation: neutral[l]	**-.781**	**.251**	**.002**
Parent self-care expectation: positive[l]	-.497	.571	.385
Constant	-1.296	1.238	.296

Model fit: $F(80,206) = 3.81$, $p<.001$

Table B5. Continued

[a]Coefficients from bivariate probit model predicting at least one asthma-related physician visit: no visits=0, at least one visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

Table B6. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least One Asthma-Related Physician Visit and Parental Insurance Coverage with *Average* Instrumental Variable (N=559)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	.287	.720	.690
Child age (yrs)	**-.041**	**.018**	**.021**
Number of children	-.028	.068	.687
Parent physical health score (PCS-12)	-.010	.009	.295
Parent mental health score (MCS-12)	.006	.008	.478
Child insurance: private[b]	-.217	.358	.545
Child insurance: multiple sources[b]	-.641	.468	.171
Two-parent home	.391	.199	.050
Oldest child	-.035	.157	.825
Parent use: 1-2 visits[c]	-.305	.272	.262
Parent use: 3-6 visits[c]	.144	.266	.587
Parent use: >6 visits[c]	-.211	.298	.480
Child health: good[d]	-.288	.260	.268
Child health: very good[d]	**-.764**	**.266**	**.004**
Child health: excellent[d]	**-.667**	**.267**	**.013**
Child has limitation	.296	.233	.205
Child race: African American[e]	-.227	.218	.300
Child race: other[e]	-.285	.254	.262
Child race: Hispanic[e]	.040	.223	.858
Family income: 100%-124% FPL[f]	-.478	.394	.226
Family income: 125%-199% FPL[f]	-.108	.239	.652
Family income: 200%-399% FPL[f]	-.072	.270	.789
Family income: ≥400% FPL[f]	.043	.307	.889
Metropolitan Statistical Area	-.010	.219	.964
Region: Midwest[g]	-.280	.230	.224
Region: South[g]	-.343	.222	.123
Region: West[g]	**-.798**	**.224**	**<.001**
Parent worry: worried[h]	.272	.157	.084
Parent worry: don't know[h]	**.639**	**.241**	**.008**
Parent education: high school[i]	.355	.288	.219
Parent education: bachelor's degree[i]	**1.103**	**.343**	**.001**
Parent education: graduate degree[i]	**.743**	**.364**	**.042**
Parent education: other degree[i]	.463	.327	.157
Comfort w/English	-.189	.381	.620
Parent employment: part time[j]	-.048	.186	.795
Parent employment: full time[j]	**-.473**	**.187**	**.012**
Parent risk aversion: risk neutral[k]	.017	.157	.915
Parent risk aversion: risk loving[k]	-.234	.418	.575
Parent self-care expectation: neutral[l]	.094	.178	.596
Parent self-care expectation: positive[l]	.914	.490	.063

Table B6. Continued

Constant	.468	.884	.597
Parental insurance coverage			
Parental eligibility for insurance	**.903**	**.237**	**<.001**
Child age (yrs)	**-.045**	**.022**	**.043**
Number of children	.184	.095	.055
Parent physical health score (PCS-12)	.004	.011	.691
Parent mental health score (MCS-12)	.002	.010	.887
Child insurance: private[b]	**2.123**	**.450**	**<.001**
Child insurance: multiple sources[b]	**1.627**	**.573**	**.005**
Two-parent home	-.095	.234	.808
Oldest child	**.534**	**.212**	**.019**
Parent use: 1-2 visits[c]	.873	.398	.051
Parent use: 3-6 visits[c]	**.950**	**.267**	**<.001**
Parent use: >6 visits[c]	**1.301**	**.368**	**<.001**
Child health: good[d]	.087	.338	.807
Child health: very good[d]	**1.006**	**.373**	**.009**
Child health: excellent[d]	-.148	.361	.701
Child has limitation	.129	.269	.695
Child race: African American[e]	.615	.332	.071
Child race: other[e]	.839	.480	.099
Child race: Hispanic[e]	.167	.356	.669
Family income: 100%-124% FPL[f]	-.345	.440	.407
Family income: 125%-199% FPL[f]	-.198	.328	.530
Family income: 200%-399% FPL[f]	-.094	.470	.829
Family income: ≥400% FPL[f]	.406	.639	.540
Metropolitan Statistical Area	.229	.279	.412
Region: Midwest[g]	**-.974**	**.470**	**.036**
Region: South[g]	**-1.021**	**.364**	**.005**
Region: West[g]	-.445	.414	.283
Parent worry: worried[h]	-.351	.249	.185
Parent worry: don't know[h]	-.790	.435	.109
Parent education: high school[i]	-.694	.350	.055
Parent education: bachelor's degree[i]	.168	.560	.759
Parent education: graduate degree[i]	-.166	.576	.849
Parent education: other degree[i]	-.602	.446	.214
Comfort w/English	**1.250**	**.355**	**.001**
Parent employment: part time[j]	.331	.279	.247
Parent employment: full time[j]	-.017	.327	.891
Parent risk aversion: risk neutral[k]	.207	.204	.340
Parent risk aversion: risk loving[k]	-.269	.472	.546
Parent self-care expectation: neutral[l]	**-.798**	**.252**	**.002**
Parent self-care expectation: positive[l]	-.502	.600	.385
Constant	-1.208	1.231	.399

Model fit: $F(80, 206) = 4.07$, $p<.001$

Table B6. Continued

[a]Coefficients from bivariate probit model predicting at least one asthma-related physician visit: no visits=0, at least one visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

Table B7. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least One Asthma-Related Physician Visit and Parental Insurance Coverage with *High* Instrumental Variable (N=559)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	.222	.639	.729
Child age (yrs)	**-.042**	**.018**	**.019**
Number of children	-.027	.068	.696
Parent physical health score (PCS-12)	-.010	.009	.288
Parent mental health score (MCS-12)	.006	.008	.448
Child insurance: private[b]	-.191	.328	.561
Child insurance: multiple sources[b]	-.629	.460	.173
Two-parent home	.389	.199	.052
Oldest child	-.029	.158	.853
Parent use: 1-2 visits[c]	-.298	.268	.266
Parent use: 3-6 visits[c]	.155	.257	.546
Parent use: >6 visits[c]	-.196	.287	.494
Child health: good[d]	-.288	.260	.270
Child health: very good[d]	**-.765**	**.267**	**.005**
Child health: excellent[d]	**-.672**	**.268**	**.013**
Child has limitation	.298	.232	.201
Child race: African American[e]	-.221	.219	.313
Child race: other[e]	-.279	.255	.276
Child race: Hispanic[e]	.044	.224	.845
Family income: 100%-124% FPL[f]	-.491	.380	.197
Family income: 125%-199% FPL[f]	-.112	.236	.634
Family income: 200%-399% FPL[f]	-.076	.266	.775
Family income: ≥400% FPL[f]	-.045	.304	.881
Metropolitan Statistical Area	-.008	.218	.971
Region: Midwest[g]	-.288	.227	.206
Region: South[g]	-.351	.217	.107
Region: West[g]	**-.805**	**.220**	**<.001**
Parent worry: worried[h]	.270	.158	.088
Parent worry: don't know[h]	**.636**	**.239**	**.008**
Parent education: high school[i]	.337	.286	.238
Parent education: bachelor's degree[i]	**1.091**	**.342**	**.002**
Parent education: graduate degree[i]	**.731**	**.363**	**.045**
Parent education: other degree[i]	.452	.327	.168
Comfort w/English	-.169	.376	.653
Parent employment: part time[j]	-.049	.186	.794
Parent employment: full time[j]	**-.476**	**.187**	**.011**
Parent risk aversion: risk neutral[k]	.015	.157	.922
Parent risk aversion: risk loving[k]	-.247	.411	.548
Parent self care expectation: neutral[l]	.089	.176	.615
Parent self care expectation: positive[l]	.914	.486	.061

Table B7. Continued

Constant	.503	.870	.564
Parental insurance coverage			
Parental eligibility for insurance	**1.079**	**.264**	**<.001**
Child age (yrs)	**-.048**	**.022**	**.029**
Number of children	.119	.094	.208
Parent physical health score (PCS-12)	.005	.011	.649
Parent mental health score (MCS-12)	.0006	.009	.946
Child insurance: private[b]	**2.179**	**.468**	**<.001**
Child insurance: multiple sources[b]	**1.732**	**.585**	**.003**
Two-parent home	-.034	.227	.882
Oldest child	**.483**	**.216**	**.026**
Parent use: 1-2 visits[c]	**.909**	**.379**	**.017**
Parent use: 3-6 visits[c]	**.879**	**.266**	**.001**
Parent use: >6 visits[c]	**1.324**	**.372**	**<.001**
Child health: good[d]	-.017	.340	.960
Child health: very good[d]	**.876**	**.376**	**.021**
Child health: excellent[d]	-.194	.354	.584
Child has limitation	-.041	.271	.880
Child race: African American[e]	**.706**	**.319**	**.028**
Child race: other[e]	.770	.414	.064
Child race: Hispanic[e]	.119	.360	.742
Family income: 100%-124% FPL[f]	-.513	.419	.221
Family income: 125%-199% FPL[f]	-.404	.328	.219
Family income: 200%-399% FPL[f]	-.169	.471	.721
Family income: ≥400% FPL[f]	.254	.640	.691
Metropolitan Statistical Area	.283	.275	.305
Region: Midwest[g]	**-1.062**	**.474**	**.026**
Region: South[g]	**-1.158**	**.368**	**.002**
Region: West[g]	-.421	.415	.311
Parent worry: worried[h]	-.370	.257	.151
Parent worry: don't know[h]	**-.902**	**.423**	**.034**
Parent education: high school[i]	**-.804**	**.355**	**.024**
Parent education: bachelor's degree[i]	.150	.544	.783
Parent education: graduate degree[i]	-.048	.563	.932
Parent education: other degree[i]	-.500	.424	.239
Comfort w/English	**1.119**	**.342**	**.001**
Parent employment: part time[j]	**.619**	**.303**	**.042**
Parent employment: full time[j]	.068	.284	.810
Parent risk aversion: risk neutral[k]	.201	.211	.343
Parent risk aversion: risk loving[k]	-.273	.452	.547
Parent self-care expectation: neutral[l]	**-.870**	**.264**	**.001**
Parent self-care expectation: positive[l]	-.736	.548	.180
Constant	-.852	1.235	.491

Model fit: $F(80, 206) = 3.65$, $p<.001$

Table B7. Continued

[a]Coefficients from bivariate probit model predicting at least one asthma-related physician visit: no visits=0, at least one visit=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self care expectation: negative

APPENDIX C: SUPPLEMENTAL ANALYSES FOR AT LEAST TWO ASTHMA-RELATED PHYSICIAN VISITS

Table C1 presents the results of the probit analysis for having at least two asthma-related visits with the parent health care utilization variable dropped. Table C2 displays the variance inflation factors from the linear probability model for at least two asthma-related visits. Tables C3-C6 contain the bivariate probit results for having at least two asthma-related physician visits. There is one table for each of the four instruments. In these tables, bold-face type indicates significance at the $\alpha=0.05$ level.

Table C1. Coefficients and Marginal Effects from Probit Model Predicting Whether Child had at Least Two Asthma-Related Physician Visits that Does Not Include ParentalHealth Care Utilization (N=559)

Variable	b[a]	SE	p	Marginal effects
Parent insured	-.241	.270	.372	-.04
Child age (yrs)	-.027	.018	.126	-.004
Number of children	-.073	.081	.364	-.01
Parent physical health score (PCS-12)	-.007	.011	.536	-.001
Parent mental health score (MCS-12)	.004	.009	.640	.001
Child insurance: private[b]	.087	.304	.776	.01
Child insurance: multiple sources[b]	-.438	.416	.293	-.06
Two-parent home	-.132	.230	.567	-.02
Oldest child	-.215	.176	.222	-.03
Child health: good[c]	**-.976**	**.320**	**.002**	**-.14**
Child health: very good[c]	**-1.037**	**.308**	**.001**	**-.15**
Child health: excellent[c]	**-1.260**	**.340**	**<.001**	**-.18**
Child has limitation	**.466**	**.234**	**.048**	**.07**
Child race: African American[d]	-.484	.272	.076	-.07
Child race: other[d]	.165	.271	.543	.02
Child race: Hispanic[d]	-.127	.252	.615	-.02
Family income: 100%-124% FPL[e]	-.198	.372	.595	-.03
Family income: 125%-199% FPL[e]	.157	.267	.556	.02
Family income: 200%-399% FPL[e]	.246	.312	.431	.04
Family income: ≥400% FPL[e]	.182	.383	.634	.03
Metropolitan Statistical Area	-.008	.240	.973	-.001
Region: Midwest[f]	**-.746**	**.251**	**.003**	**-.11**
Region: South[f]	**-.852**	**.230**	**<.001**	**-.12**
Region: West[f]	**-1.070**	**.222**	**<.001**	**-.16**
Parent worry: worried[g]	.163	.192	.398	.02
Parent worry: don't know[g]	.222	.318	.486	.03
Parent education: high school[h]	.511	.266	.056	.07
Parent education: bachelor's degree[h]	**1.119**	**.398**	**.005**	**.16**
Parent education: graduate degree[h]	**.959**	**.419**	**.023**	**.14**
Parent education: other degree[h]	**.752**	**.374**	**.045**	**.11**
Comfort w/English	-.036	.391	.927	-.01
Parent employment: part time[i]	-.187	.210	.373	-.03
Parent employment: full time[i]	**-.707**	**.201**	**.001**	**-.10**
Parent risk aversion: risk neutral[j]	.103	.177	.560	.02
Parent risk aversion: risk loving[j]	-.919	.566	.105	-.13
Parent self-care expectation: neutral/positive[k]	-.274	.205	.183	-.04
Constant	1.099	.918	.232	

Model fit: F(36,250)=2.95, p<.001

Table C1. Continued

[a]Coefficients from probit model predicting whether child has at least two asthma-related physician visits: less than two visits=0, at least two visits=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Child health: fair/poor

[d]Reference category: Child race/ethnicity: Caucasian

[e]Reference category: Family income: <100% FPL

[f]Reference category: Region: Northeast

[g]Reference category: Parent worry: not worried

[h]Reference category: Parent education: No high school diploma or GED

[i]Reference category: Parent employment: not working

[j]Reference category: Parent risk aversion: risk averse

[k]Reference category: Parent self care expectation: negative

Table C2. Variance Inflation Factors (VIFs) from Linear Probability Model Predicting at Least Two Asthma-Related Physician Visits (N=559)

Variable	VIF
Family income: ≥400% FPL	5.92
Child health: excellent	4.73
Child health: very good	4.68
Child health: good	4.17
Family income: 200%-399% FPL	4.07
Parent education: high school	4.06
Parent education: bachelor's degree	3.86
Parent education: other degree	3.33
Child insurance: private	3.33
Parent education: graduate degree	2.88
Parent use: >6 visits	2.34
Region: South	2.26
Parent use: 3-6 visits	2.11
Parent employment: full time	1.99
Parent use: 1-2 visits	1.98
Region: Midwest	1.92
Region: West	1.92
Family income: 125%-199% FPL	1.88
Parent employment: part time	1.73
Number of children	1.71
Child race: African American	1.71
Child race: Hispanic	1.65
Two-parent home	1.64
Parent insured	1.56
Comfort w/English	1.44
Oldest child	1.40
Parent physical health score (PCS-12)	1.34
Parent worry: worried	1.29
Parent risk aversion: risk loving	1.28
Family income: 100%-124% FPL	1.27
Metropolitan Statistical Area	1.27
Parent mental health score (MCS-12)	1.26
Child race: other	1.24
Parent self-care expectation: neutral/positive	1.23
Parent risk aversion: risk neutral	1.21
Child age (yrs)	1.20
Child insurance: multiple sources	1.16
Parent worry: don't know	1.16
Child has limitation	1.15

Table C3. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least Two Asthma-Related Physician Visits and Parental Insurance Coverage with *Low* Instrumental Variable (N=559)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.604	.676	.373
Child age (yrs)	-.029	.018	.120
Number of children	-.083	.081	.306
Parent physical health score (PCS-12)	-.004	.011	.716
Parent mental health score (MCS-12)	.007	.009	.394
Child insurance: private[b]	.169	.356	.635
Child insurance: multiple sources[b]	-.390	.443	.379
Two-parent home	-.165	.243	.497
Oldest child	-.214	.175	.221
Parent use: 1-2 visits[c]	-.049	.280	.862
Parent use: 3-6 visits[c]	.103	.287	.720
Parent use: >6 visits[c]	.338	.322	.295
Child health: good[d]	**-.975**	**.331**	**.003**
Child health: very good[d]	**-1.045**	**.323**	**.001**
Child health: excellent[d]	**-1.279**	**.338**	**<.001**
Child has limitation	.433	.240	.072
Child race: African American[e]	-.437	.273	.110
Child race: other[e]	.282	.264	.286
Child race: Hispanic[e]	-.079	.249	.751
Family income: 100%-124% FPL[f]	-.314	.393	.426
Family income: 125%-199% FPL[f]	.161	.273	.557
Family income: 200%-399% FPL[f]	.206	.323	.524
Family income: ≥400% FPL[f]	.157	.394	.691
Metropolitan Statistical Area	.002	.255	.995
Region: Midwest[g]	**-.760**	**.256**	**.003**
Region: South[g]	**-.868**	**.242**	**<.001**
Region: West[g]	**-1.124**	**.227**	**<.001**
Parent worry: worried[h]	.151	.191	.430
Parent worry: don't know[h]	.172	.326	.598
Parent education: high school[i]	.446	.304	.144
Parent education: bachelor's degree[i]	**1.112**	**.423**	**.009**
Parent education: graduate degree[i]	**.930**	**.452**	**.040**
Parent education: other degree[i]	.753	.391	.055
Comfort w/English	-.015	.424	.972
Parent employment: part time[j]	-.226	.208	.279
Parent employment: full time[j]	**-.776**	**.208**	**<.001**
Parent risk aversion: risk neutral[k]	.109	.173	.528
Parent risk aversion: risk loving[k]	-.999	.570	.081
Parent self-care expectation: neutral/positive[l]	-.298	.209	.154

Table C3. Continued

Constant	1.103	1.069	.303
Parental insurance coverage			
Parental eligibility for insurance	**.874**	**.267**	**.001**
Child age (yrs)	-.032	.023	.162
Number of children	.130	.101	.201
Parent physical health score (PCS-12)	.005	.011	.648
Parent mental health score (MCS-12)	.007	.010	.477
Child insurance: private[b]	**2.039**	**.466**	**<.001**
Child insurance: multiple sources[b]	**1.371**	**.587**	**.020**
Two-parent home	-.113	.250	.652
Oldest child	.333	.189	.079
Parent use: 1-2 visits[c]	**.731**	**.303**	**.016**
Parent use: 3-6 visits[c]	**1.004**	**.275**	**<.001**
Parent use: >6 visits[c]	**1.435**	**.391**	**<.001**
Child health: good[d]	.092	.341	.787
Child health: very good[d]	**.791**	**.379**	**.038**
Child health: excellent[d]	-.117	.328	.722
Child has limitation	.020	.276	.943
Child race: African American[e]	.513	.327	.118
Child race: other[e]	.592	.431	.170
Child race: Hispanic[e]	.107	.356	.764
Family income: 100%-124% FPL[f]	-.612	.438	.164
Family income: 125%-199% FPL[f]	-.394	.335	.240
Family income: 200%-399% FPL[f]	-.358	.447	.423
Family income: ≥400% FPL[f]	.041	.661	.950
Metropolitan Statistical Area	.231	.280	.409
Region: Midwest[g]	-.884	.458	.054
Region: South[g]	**-.955**	**.367**	**.010**
Region: West[g]	-.443	.421	.293
Parent worry: worried[h]	-.263	.240	.273
Parent worry: don't know[h]	-.448	.360	.215
Parent education: high school[i]	**-.679**	**.328**	**.040**
Parent education: bachelor's degree[i]	.066	.604	.913
Parent education: graduate degree[i]	.117	.605	.847
Parent education: other degree[i]	-.393	.409	.337
Comfort w/English	**1.234**	**.328**	**<.001**
Parent employment: part time[j]	.056	.287	.845
Parent employment: full time[j]	-.360	.286	.209
Parent risk aversion: risk neutral[k]	.207	.207	.319
Parent risk aversion: risk loving[k]	-.225	.510	.660
Parent self-care expectation: neutral/positive[l]	**-.785**	**.242**	**.001**
Constant	-.908	1.185	.444

Model fit: $F(78,208) = 4.80$, $p<.001$

Table C3. Continued

[a]Coefficients from bivariate probit model predicting at least two asthma-related physician visits: less than two visits=0, at least two visits=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

Table C4. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least Two Asthma-Related Physician Visits and Parental Insurance Coverage with *Median* Instrumental Variable (N=559)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.626	.670	.351
Child age (yrs)	-.029	.018	.118
Number of children	-.083	.081	.309
Parent physical health score (PCS-12)	-.004	.011	.713
Parent mental health score (MCS-12)	.008	.009	.386
Child insurance: private[b]	.175	.356	.624
Child insurance: multiple sources[b]	-.386	.442	.383
Two-parent home	-.166	.242	.495
Oldest child	-.213	.176	.225
Parent use: 1-2 visits[c]	-.046	.279	.869
Parent use: 3-6 visits[c]	.106	.286	.712
Parent use: >6 visits[c]	.343	.320	.284
Child health: good[d]	**-.973**	**.331**	**.004**
Child health: very good[d]	**-1.044**	**.323**	**.001**
Child health: excellent[d]	**-1.279**	**.338**	**<.001**
Child has limitation	.433	.240	.072
Child race: African American[e]	-.436	.272	.110
Child race: other[e]	.283	.264	.285
Child race: Hispanic[e]	-.080	.249	.748
Family income: 100%-124% FPL[f]	-.316	.390	.419
Family income: 125%-199% FPL[f]	.160	.273	.559
Family income: 200%-399% FPL[f]	.203	.323	.530
Family income: ≥400% FPL[f]	.155	.394	.695
Metropolitan Statistical Area	.002	.254	.994
Region: Midwest[g]	**-.761**	**.255**	**.003**
Region: South[g]	**-.870**	**.241**	**<.001**
Region: West[g]	**-1.125**	**.226**	**<.001**
Parent worry: worried[h]	.149	.192	.438
Parent worry: don't know[h]	.170	.326	.602
Parent education: high school[i]	.441	.300	.143
Parent education: bachelor's degree[i]	**1.109**	**.421**	**.009**
Parent education: graduate degree[i]	**.926**	**.451**	**.041**
Parent education: other degree[i]	.751	.392	.056
Comfort w/English	-.014	.428	.974
Parent employment: part time[j]	-.226	.208	.278
Parent employment: full time[j]	**-.776**	**.208**	**<.001**
Parent risk aversion: risk neutral[k]	.110	.173	.526
Parent risk aversion: risk loving[k]	-.998	.569	.080
Parent self-care expectation: neutral/positive[l]	-.299	.207	.149

Table C4. Continued

Constant	1.117	1.071	.298
Parental insurance coverage			
Parental eligibility for insurance	**.838**	**.227**	**<.001**
Child age (yrs)	-.038	.024	.105
Number of children	.145	.100	.148
Parent physical health score (PCS-12)	.004	.011	.739
Parent mental health score (MCS-12)	.002	.010	.803
Child insurance: private[b]	**2.090**	**.437**	**<.001**
Child insurance: multiple sources[b]	**1.495**	**.597**	**.013**
Two-parent home	-.079	.250	.754
Oldest child	**.393**	**.191**	**.041**
Parent use: 1-2 visits[c]	**.669**	**.299**	**.026**
Parent use: 3-6 visits[c]	**.967**	**.274**	**<.001**
Parent use: >6 visits[c]	**1.353**	**.400**	**.001**
Child health: good[d]	.074	.336	.825
Child health: very good[d]	**.811**	**.366**	**.027**
Child health: excellent[d]	-.073	.324	.821
Child has limitation	.119	.268	.658
Child race: African American[e]	.568	.323	.080
Child race: other[e]	.612	.431	.157
Child race: Hispanic[e]	.121	.354	.732
Family income: 100%-124% FPL[f]	-.365	.448	.415
Family income: 125%-199% FPL[f]	-.229	.346	.510
Family income: 200%-399% FPL[f]	-.126	.478	.793
Family income: ≥400% FPL[f]	.246	.666	.712
Metropolitan Statistical Area	.216	.288	.454
Region: Midwest[g]	**-.988**	**.475**	**.038**
Region: South[g]	**-.924**	**.364**	**.012**
Region: West[g]	-.466	.413	.261
Parent worry: worried[h]	-.254	.245	.300
Parent worry: don't know[h]	-.470	.359	.191
Parent education: high school[i]	**-.691**	**.340**	**.043**
Parent education: bachelor's degree[i]	.028	.604	.964
Parent education: graduate degree[i]	.062	.612	.919
Parent education: other degree[i]	-.424	.409	.300
Comfort w/English	**1.230**	**.326**	**<.001**
Parent employment: part time[j]	.205	.289	.480
Parent employment: full time[j]	-.277	.280	.323
Parent risk aversion: risk neutral[k]	.214	.208	.303
Parent risk aversion: risk loving[k]	-.146	.492	.766
Parent self-care expectation: neutral/positive[l]	**-.770**	**.244**	**.002**
Constant	-.941	1.185	.428

Model fit: $F(78,208) = 4.60$, $p<.001$

Table C4. Continued

[a]Coefficients from bivariate probit model predicting at least two asthma-related physician visits: less than two visits=0, at least two visits=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

Table C5. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least Two Asthma-Related Physician Visits and Parental Insurance Coveragewith *Average* Instrumental Variable (N=559)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.723	.673	.284
Child age (yrs)	-.029	.018	.114
Number of children	-.082	.081	.314
Parent physical health score (PCS-12)	-.004	.011	.720
Parent mental health score (MCS-12)	.008	.009	.366
Child insurance: private[b]	.197	.353	.577
Child insurance: multiple sources[b]	-.369	.439	.402
Two-parent home	-.167	.241	.488
Oldest child	-.209	.176	.236
Parent use: 1-2 visits[c]	-.038	.277	.892
Parent use: 3-6 visits[c]	.117	.284	.681
Parent use: >6 visits[c]	.359	.316	.258
Child health: good[d]	**-.966**	**.332**	**.004**
Child health: very good[d]	**-1.037**	**.324**	**.002**
Child health: excellent[d]	**-1.279**	**.339**	**<.001**
Child has limitation	.433	.239	.071
Child race: African American[e]	-.433	.271	.112
Child race: other[e]	.289	.263	.274
Child race: Hispanic[e]	-.078	.248	.754
Family income: 100%-124% FPL[f]	-.329	.384	.393
Family income: 125%-199% FPL[f]	.156	.273	.567
Family income: 200%-399% FPL[f]	.196	.325	.547
Family income: ≥400% FPL[f]	.147	.396	.710
Metropolitan Statistical Area	.008	.254	.976
Region: Midwest[g]	**-.764**	**.253**	**.003**
Region: South[g]	**-.878**	**.240**	**<.001**
Region: West[g]	**-1.130**	**.226**	**<.001**
Parent worry: worried[h]	.145	.193	.453
Parent worry: don't know[h]	.163	.325	.616
Parent education: high school[i]	.417	.297	.162
Parent education: bachelor's degree[i]	**1.089**	**.420**	**.010**
Parent education: graduate degree[i]	**.907**	**.449**	**.044**
Parent education: other degree[i]	.732	.391	.062
Comfort w/English	.015	.430	.972
Parent employment: part time[j]	-.225	.208	.279
Parent employment: full time[j]	**-.776**	**.207**	**<.001**
Parent risk aversion: risk neutral[k]	.110	.173	.525
Parent risk aversion: risk loving[k]	-1.003	.566	.077
Parent self-care expectation: neutral/positive[l]	-.306	.207	.139

Table C5. Continued

Constant	1.160	1.057	.273
Parental insurance coverage			
Parental eligibility for insurance	**.968**	**.221**	**<.001**
Child age (yrs)	**-.049**	**.023**	**.032**
Number of children	.174	.101	.085
Parent physical health score (PCS-12)	.002	.012	.896
Parent mental health score (MCS-12)	.001	.010	.892
Child insurance: private[b]	**2.097**	**.441**	**<.001**
Child insurance: multiple sources[b]	**1.660**	**.597**	**.006**
Two-parent home	-.063	.253	.804
Oldest child	**.415**	**.190**	**.030**
Parent use: 1-2 visits[c]	**.683**	**.305**	**.026**
Parent use: 3-6 visits[c]	**.985**	**.277**	**<.001**
Parent use: >6 visits[c]	**1.275**	**.393**	**.001**
Child health: good[d]	.044	.337	.895
Child health: very good[d]	**.850**	**.372**	**.023**
Child health: excellent[d]	-.073	.328	.825
Child has limitation	.095	.266	.722
Child race: African American[e]	.540	.327	.100
Child race: other[e]	.660	.442	.136
Child race: Hispanic[e]	.161	.360	.655
Family income: 100%-124% FPL[f]	-.363	.446	.416
Family income: 125%-199% FPL[f]	-.161	.349	.646
Family income: 200%-399% FPL[f]	-.006	.484	.989
Family income: ≥400% FPL[f]	.327	.674	.629
Metropolitan Statistical Area	.190	.283	.503
Region: Midwest[g]	**-1.091**	**.464**	**.019**
Region: South[g]	**-.999**	**.365**	**.007**
Region: West[g]	-.465	.417	.266
Parent worry: worried[h]	-.319	.246	.197
Parent worry: don't know[h]	-.512	.363	.159
Parent education: high school[i]	-.657	.354	.064
Parent education: bachelor's degree[i]	-.020	.608	.974
Parent education: graduate degree[i]	.053	.600	.929
Parent education: other degree[i]	-.387	.418	.356
Comfort w/English	**1.225**	**.329**	**<.001**
Parent employment: part time[j]	.314	.281	.264
Parent employment: full time[j]	-.207	.281	.462
Parent risk aversion: risk neutral[k]	.170	.208	.414
Parent risk aversion: risk loving[k]	-.219	.494	.657
Parent self-care expectation: neutral/positive[l]	**-.782**	**.245**	**.002**
Constant	-.830	1.168	.478

Model fit: $F(78,208) = 4.81$, $p<.001$

Table C5. Continued

[a]Coefficients from bivariate probit model predicting at least two asthma-related physician visits: less than two visits=0, at least two visits=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

Table C6. Coefficients from Bivariate Probit Model Predicting Whether Child had at Least Two Asthma-Related Physician Visits and Parental Insurance Coverage with *High* Instrumental Variable (N=559)

Variable	b[a]	SE	p
Well-child visit			
Parent insured	-.652	.620	.294
Child age (yrs)	-.029	.019	.119
Number of children	-.083	.081	.307
Parent physical health score (PCS-12)	-.004	.011	.709
Parent mental health score (MCS-12)	.007	.009	.389
Child insurance: private[b]	.180	.353	.610
Child insurance: multiple sources[b]	-.375	.440	.394
Two-parent home	-.167	.242	.492
Oldest child	-.214	.176	.224
Parent use: 1-2 visits[c]	-.045	.276	.872
Parent use: 3-6 visits[c]	.108	.282	.701
Parent use: >6 visits[c]	.346	.312	.268
Child health: good[d]	**-.970**	**.332**	**.004**
Child health: very good[d]	**-1.040**	**.324**	**.001**
Child health: excellent[d]	**-1.276**	**.340**	**<.001**
Child has limitation	.434	.240	.072
Child race: African American[e]	-.439	.272	.108
Child race: other[e]	.284	.263	.281
Child race: Hispanic[e]	-.080	.249	.748
Family income: 100%-124% FPL[f]	-.321	.386	.407
Family income: 125%-199% FPL[f]	.160	.272	.557
Family income: 200%-399% FPL[f]	.201	.323	.534
Family income: ≥400% FPL[f]	.152	.394	.699
Metropolitan Statistical Area	.007	.254	.979
Region: Midwest[g]	**-.759**	**.253**	**.003**
Region: South[g]	**-.870**	**.239**	**<.001**
Region: West[g]	**-1.127**	**.226**	**<.001**
Parent worry: worried[h]	.148	.193	.443
Parent worry: don't know[h]	.169	.324	.603
Parent education: high school[i]	.439	.293	.135
Parent education: bachelor's degree[i]	**1.106**	**.418**	**.009**
Parent education: graduate degree[i]	**.925**	**.444**	**.038**
Parent education: other degree[i]	.748	.390	.056
Comfort w/English	-.010	.421	.981
Parent employment: part time[j]	-.225	.208	.280
Parent employment: full time[j]	**-.774**	**.207**	**<.001**
Parent risk aversion: risk neutral[k]	.110	.173	.525
Parent risk aversion: risk loving[k]	-.993	.566	.080
Parent self-care expectation: neutral/positive[l]	-.301	.208	.149

Table C6. Continued

Constant	1.137	1.066	.287
Parental insurance coverage			
Parental eligibility for insurance	**1.147**	**.246**	**<.001**
Child age (yrs)	**-.050**	**.023**	**.029**
Number of children	.101	.095	.291
Parent physical health score (PCS-12)	.004	.011	.707
Parent mental health score (MCS-12)	.002	.009	.858
Child insurance: private[b]	**2.147**	**.458**	**<.001**
Child insurance: multiple sources[b]	**1.810**	**.601**	**.003**
Two-parent home	.023	.254	.928
Oldest child	.358	.193	.065
Parent use: 1-2 visits[c]	**.754**	**.314**	**.017**
Parent use: 3-6 visits[c]	**.933**	**.276**	**.001**
Parent use: >6 visits[c]	**1.319**	**.398**	**.001**
Child health: good[d]	-.076	.335	.820
Child health: very good[d]	.716	.370	.054
Child health: excellent[d]	-.152	.328	.644
Child has limitation	-.085	.264	.748
Child race: African American[e]	.643	.334	.055
Child race: other[e]	.638	.406	.117
Child race: Hispanic[e]	.114	.374	.761
Family income: 100%-124% FPL[f]	-.587	.417	.160
Family income: 125%-199% FPL[f]	-.406	.341	.235
Family income: 200%-399% FPL[f]	-.141	.486	.772
Family income: ≥400% FPL[f]	.176	.684	.797
Metropolitan Statistical Area	.261	.284	.359
Region: Midwest[g]	**-1.142**	**.464**	**.014**
Region: South[g]	**-1.136**	**.365**	**.002**
Region: West[g]	-.415	.417	.321
Parent worry: worried[h]	-.338	.252	.181
Parent worry: don't know[h]	-.694	.379	.068
Parent education: high school[i]	**-.797**	**.361**	**.028**
Parent education: bachelor's degree[i]	-.022	.591	.970
Parent education: graduate degree[i]	.149	.584	.799
Parent education: other degree[i]	-.342	.412	.408
Comfort w/English	**1.149**	**.325**	**<.001**
Parent employment: part time[j]	**.643**	**.296**	**.031**
Parent employment: full time[j]	-.047	.266	.859
Parent risk aversion: risk neutral[k]	.178	.216	.409
Parent risk aversion: risk loving[k]	-.214	.469	.648
Parent self-care expectation: neutral/positive[l]	**-.850**	**.257**	**.001**
Constant	-.735	1.193	.539

Model fit: $F(78,208) = 4.45$, $p<.001$

Table C6. Continued

[a]Coefficients from bivariate probit model predicting at least two asthma-related physician visits: less than two visits=0, at least two visits=1 and parental insurance coverage: no coverage=0, coverage=1

[b]Reference category: Child insurance: Medicaid and other public

[c]Reference category: Parent use: no visits

[d]Reference category: Child health: fair/poor

[e]Reference category: Child race/ethnicity: Caucasian

[f]Reference category: Family income: <100% FPL

[g]Reference category: Region: Northeast

[h]Reference category: Parent worry: not worried

[i]Reference category: Parent education: No high school diploma or GED

[j]Reference category: Parent employment: not working

[k]Reference category: Parent risk aversion: risk averse

[l]Reference category: Parent self-care expectation: negative

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