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THE RELATIONSHIP OF ADVERSE CHILDHOOD EXPERIENCES WITH ACCESS TO
PRIMARY HEALTH CARE

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ABSTRACT

This thesis examines the relationship between adverse childhood experiences and access to primary health care for children ages 0 to 17. Specifically, it investigates the hypothesis that children who have had more adverse childhood experiences have worse access to primary health care using data from the National Survey of Children's Health. Between 2011 and 2012, 23% of the 88,771 children surveyed experienced 1 adverse childhood experience and 20.2% experienced 2 or more adverse childhood experiences. Linear regression results showed that children who experienced 1 ACE and children who experienced 2 or more ACEs had, on average, a 0.15 and 0.25 point lower access to primary health care score compared to children who experienced 0 ACEs. All findings of this study were statistically significant and reveal that children who experience more adverse events have less access to primary health care. This finding is important because it identifies another risk factor for poor access to primary health care for children. Ensuring children's access to primary care is a public policy goal because poor access leads to a number of immediate consequences, such as poor childhood health and low educational attainment, as well as long-term negative consequences such as poor adult health outcomes and low socioeconomic status (Case & Paxson, 2006).

TABLE OF CONTENTS

List of Tables	iii
Acknowledgements.....	iv
Chapter 1 Introduction	1
Chapter 2 Methods.....	7
Chapter 3 Results	14
Chapter 4 Discussion	20
Chapter 5 Limitations	23
Chapter 6 Conclusion.....	25
Appendix A Access to Primary Health Care Survey Questions	26
Appendix B Adverse Childhood Experiences Survey Questions	28
Appendix C SAS Input	30
BIBLIOGRAPHY.....	36

LIST OF TABLES

Table 1. Summary of Adverse Childhood Experiences Survey Items	9
Table 2. Survey Item Representation for Each Dimension of Access	11
Table 3. Sample Population Characteristics by Overall Access to Primary Health Care	15
Table 4. Sample Population Characteristics by Number of Adverse Childhood Experiences.	17
Table 5. Results from Regression of Access to Primary Health Care on Adverse Childhood Experiences	19

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Chapter 1

Introduction

Importance

Poor childhood health outcomes have a number of important long-term negative effects. First, poor childhood health outcomes affects educational attainment and economic wellbeing (Case & Paxson, 2006). Children in poor health are more likely to be absent from school than children in good health. In 2011, 4% of children missed 11 or more school days due to illness or injury (CDC, 2012). Fewer days in school negatively impacts employment opportunities and wages as an adult. For instance, one study showed that adults who had chronic diseases as a child were less likely to be in the workforce ultimately reducing their socioeconomic status (Case & Paxson, 2006).

Second, poor childhood health outcomes negatively affect adult health. A retrospective study in 2007 found that “those who report poor childhood health have increased odds of reporting poor self-rated health, a work-limiting disability, a physician-diagnosed chronic disease, and a decline in their health over a two-year period” (Haas, 2007, p. 114). Furthermore, as the severity of poor childhood health outcomes increased for a person, the severity of poor adult health outcomes increased for that same person. A significant positive association was found between serious childhood infectious diseases and serious adult chronic diseases such as cardiovascular disease, cancer, lung conditions, and arthritis (Haas, 2007). Overall, childhood health outcomes play an important role in determining long-term socioeconomic status and adult health outcomes.

As a result, research has focused on identifying key determinants of childhood health in order to improve childhood health. One important component is access to primary health care. According to Penchansky and Thomas, access to health care is defined as the fit between the patient and the health care system (1981). There are five dimensions that characterize this fit: availability, accessibility, affordability, accommodation, and acceptability (Penchansky & Thomas, 1981). Specifically, availability determines whether a provider has the appropriate resources to meet the needs of a patient (Wyszewianski & McLaughlin, 2002). Accessibility is determined by the location of a provider in relation to a patient (Penchansky & Thomas, 1981). Affordability represents a patient's ability and willingness to pay for provider services (Wyszewianski & McLaughlin, 2002). Accommodation represents a provider's willingness to meet the needs and preferences of a patient (Wyszewianski & McLaughlin, 2002). Lastly, acceptability determines a patient's content with the more immutable characteristics of a provider, and vice versa (Wyszewianski & McLaughlin, 2002). Health care services must be available, affordable, accessible, acceptable, and accommodating in order for patients to have adequate access to health care (Penchansky & Thomas, 1981).

Having adequate access to primary care is directly related to increased life expectancy, better health outcomes, and decreased poor self-rated health as an adult (Starfield, 2011). In addition, lack of access to primary health care as a child is directly related to more costly medical conditions in adulthood, such as cancer and cardiovascular disease (Redlener, et al., n.d). Thus, ensuring access to primary care is often prioritized by policymakers; for example policymakers strengthened the State Children's Health Insurance Program (SCHIP) to promote access to primary and preventive health services (Bruner, 2010).

Past research on adverse childhood experiences (ACEs) found that select individual ACEs have been linked with poor access to primary health care. ACEs are defined as traumatic experiences which include exposure to abuse, neglect, domestic violence, parental substance abuse, parental mental illness, parental discord, or crime in the home (The Adverse Childhood Experience Study, n.d.). The literature lacks information on the effect of multiple ACEs on access to primary health care for children ages 0 to 17.

Between 2011 and 2012, almost half of U.S. children (48%) experienced at least one ACE and 25% of children experienced at least two ACEs (Bethell, et al., n.d.). Given these figures, if ACEs are related to less access to primary health care, a large proportion of U.S. children may be susceptible to poorer access to primary health care because of exposure to ACEs. Reduced access to primary health care as a child has significant life implications, such as poor adult health and low socioeconomic status. This paper will examine the relationship between the number of ACEs and access to primary health care for children ages 0 to 17.

Prior Research

There are five types of ACEs commonly identified in the literature: socioeconomic hardship, parental divorce, parental incarceration, parental substance abuse, and domestic violence (Unite for Sight, 2013; McGorrian, 2003; Walker, 2005; U.S. Department of Health and Human Services, 2009; Community Overcoming Relationship Abuse, 2014). First, a child growing up in a family that experiences socioeconomic hardship is considered to have experienced an ACE. Socioeconomic hardship is classified as having trouble covering basic needs, such as food or housing (2011/12 National Survey of Children's Health). In families experiencing socioeconomic hardship, health care for children often comes second when other basic needs are not met. A report produced by Unite for Sight states that socioeconomic hardship

might delay or prevent parents from seeking health care for their sick child (2013). In addition, families experiencing financial hardship may lack the transportation needed to provide access to health care services for their children. According to the Children's Health Fund, 9% of children living in homes with income less than 50,000 dollars per year missed routine primary health care visits because of lack of transportation (Grant, et al., 2012). According to PENCHANSKY and THOMAS, routine health care visits are a primary determinant of adequate access to primary health care (1981).

Second, parental divorce places a child at risk for reduced access to primary health care because of health insurance uncertainty. In certain states, such as Massachusetts, children are at risk of losing health insurance coverage for a period of time when their parents separate (McGorrian, 2003). The problem arises if health insurance coverage was not included in the divorce settlement. If a parent does not have custody of the child and is the health insurance holder, the child is likely to lose health insurance coverage for a period of time (American Institute for Certified Public Accountants, 2014). During this period of time, the child is at risk for missing routine health care visits.

Third, a child that has lived with a parent who is serving or who has served time in jail may experience less access to primary health care for a multitude of reasons. In a number of districts and states, no support services or community-based services exist to help children when their parents are incarcerated (Walker, 2005). In addition, there is no simple way to shift caregiver authority for medical care (Walker, 2005). Because of these factors, child health needs are at risk for being delayed or not met during parental incarceration. In addition, sometimes caregivers do not seek health care services for a child whose parents are incarcerated in fear that child welfare agencies will identify and remove the child from the current situation (Oklahoma

Commission on Children and Youth, 2012). Parental incarceration directly affects access to primary health care for children because of missed routine health care visits as well as lack of caregiver authority.

Fourth, children of parents with a drug or alcohol problem are at risk for reduced access to primary health care. Research has shown that parents with substance abuse problems are more likely to neglect their parental roles, which may include ensuring a child's health and safety through regular health care (U.S. Department of Health and Human Services, 2009). For example, 23% of mothers who used cocaine during pregnancy exhibited child maltreatment by knowingly missing important primary health care visits for their child during the first 24 months of the child's life (Bethell, et al., n.d.). A child exposed to substance abuse in the home is considered to have experienced an ACE.

Fifth, a child who experiences domestic violence in the home is considered to have experienced an adverse event. Three to ten million U.S. children experience domestic violence in the household each year (Community Overcoming Relationship Abuse, 2014). Domestic violence in the National Survey of Children's Health is classified as seeing or hearing any adult in the home slap, hit, kick, punch, or beat another adult (2011/12 National Survey of Children's Health). Children exposed to domestic violence in the home are more likely to be neglected compared to children not exposed to domestic violence resulting in denied access to routine primary health care visits (Community Overcoming Relationship Abuse, 2014).

ACEs, such as socioeconomic hardship, parental divorce, parental incarceration, domestic violence, and parental substance abuse can reduce access to primary health care for children ages 0 to 17. Reduced access leads to poor childhood health outcomes, which in turn leads to poor adult health outcomes ultimately affecting the child's long-term health and

socioeconomic status. Prior research provides useful information on a single ACE's affect on access to primary health care, but 25% of children in the United States experience at least two ACEs in the same time period (Bethell, et al., n.d.). Therefore, it is important to look at whether the number of ACEs a child experiences has a negative affect on access to primary health care. This study investigates the relationship between the number of ACEs and access to primary health care. Specifically, it examines whether a child (0 to 17) with more ACEs experiences less access to primary health care. I hypothesize that children with more ACEs will have less access to primary health care because ACEs negatively impact the five dimensions of adequate access (availability, accessibility, acceptability, affordability, accommodation) to primary health care as defined by Penchansky and Thomas.

Chapter 2

Methods

Data

This study used publicly-available data from the Center for Disease Control's 2011-2012 National Survey of Children's Health (NSCH). The NSCH is a cross-sectional national telephone survey of U.S. households with at least one child aged 0 to 17 at the time of the interview. The survey was designed to evaluate the emotional and physical health of children and different factors that may affect child well-being including family interactions, medical homes, parental health, neighborhood characteristics, and school and after-school experiences (National Survey of Children's Health, 2012). A household adult answers all survey questions with respect to a single child residing in that household. One child is randomly selected as the focus of the survey in a household with more than one eligible child. Details about the data used for this study are described below.

Study sample

The 2011-12 NSCH had a total of 95,677 child-level completed interviews during the survey period: February 28, 2011 and June 25, 2012. The analytic sample consists of 88,771 respondents; 6,906 interviews were excluded because of missing/skipped responses. The analytic sample was not weighted to be representative of children in the United States ages 0 to 17.

Analysis

Independent Variable: Number of Adverse Childhood Experiences

The independent variable of interest is the number of ACEs. The NSCH contains nine individual measures of ACEs: (1) socioeconomic hardship, (2) divorce/separation of parent, (3) death of parent, (4) parent served time in jail, (5) witness to domestic violence, (6) victim of neighborhood violence, (7) lived with someone who was mentally ill or suicidal, (8) lived with someone with alcohol/drug problem, (9) treated or judged unfairly due to race/ethnicity. Five items (2, 4, 5, 7, 8) were developed and tested by the CDC for their Behavioral Risk Factor Surveillance System (BRFSS) survey (National Survey of Children's Health, 2012). The other three items (1, 3, 9) were developed specifically for the NSCH by a specially-convened Technical Expert Panel comprised of experts in children's health, community organizations, family leaders, and survey methodology (National Survey of Children's Health, 2012). The exact item wording is provided in Appendix B, but Table 1 provides a summary of the items.

Table 1. Summary of Adverse Childhood Experiences Survey Items

Survey Item	Response Options
(1) How often has it been hard to get by on your family's income?	Often Somewhat often Not very often Never
(2) Parent or guardian of child divorced or separated after child was born	Yes No
(3) Child lived with a parent or guardian who died	Yes No
(4) Child lived with a parent or guardian who served time in jail or prison	Yes No
(5) Child saw or heard any adult in the home slap, hit, kick, punch, or beat each other up	Yes No
(6) Child witnessed or was a victim of violence in his/her neighborhood	Yes No
(7) Child lived with anyone who was mentally ill, suicidal, or severely depressed for more than a couple of weeks	Yes No
(8) Child lived with anyone who had a drug or alcohol problem	Yes No
(9) Child was ever treated or judged unfairly because of his/her race or ethnicity	Yes No

Source: (2011/12 National Survey of Children's Health)

To measure the number of ACEs for this study, I created a single, composite measure from these nine individual items. For each of the nine ACEs a child experienced, s/he received a 1 and the items were summed. Thus, a child could score from 0 (no ACEs) to 9 (experienced all 9 ACEs). Eight ACE items (2, 3, 4, 5, 6, 7, 8, 9) had a dichotomous "Yes/No" response option, in which "Yes" always indicated experiencing the specified ACE (Table 1 and Appendix B). A child received one point if the respondent answered "Yes". The other ACE (1) item had four response options: "never", "not very often", "somewhat often", or "often" (Table 1 and

Appendix B). In order to create an ACE composite measure, a response of “very often” or “somewhat often” was coded as an ACE (i.e. a 1). Lastly, I created dummy variables in order to easily compare the results of the linear regression: “child experienced 0 ACEs”, “child experienced 1 ACE”, and “child experienced 2 or more ACEs”.

Dependent Variable: Access to Primary Health Care

The outcome of interest is access to primary health care. I constructed a composite measure of access based on survey items assessing each of Penchansky and Thomas’ five dimensions of access: availability, accessibility, affordability, accommodation, and acceptability (Penchansky & Thomas, 1981). In this study, I assigned survey items to each dimension and then summed the responses to create an overall access score.

First, I selected five survey items from the NSCH 2011-12 Health Care Access and Quality Data that I thought best represented each of the five dimensions of access based on the literature. Each survey item represents one of the five dimensions. The survey item “family experiences frustration in efforts to obtain health care” represents the dimension availability because availability measures the extent to which a provider has the resources to meet the needs of a patient (Wyszewianski & McLaughlin, 2002). The survey item “health insurance status” represents the dimension accessibility because accessibility is determined by a patient’s ability to pay for health care services (Penchansky & Thomas, 1981). The survey item “family had problems paying child’s medical bills” represents affordability because affordability is determined by a patient’s willingness and ability to pay for health care services (Wyszewianski & McLaughlin, 2002). The survey item “receipt of any type of medical care” represents accommodation because accommodation reflects a provider’s ability to provide services in ways that meet the needs of a patient (Wyszewianski & McLaughlin, 2002). Lastly, the survey item

“doctor sensitive to family values and customs” represents acceptability because this dimension determines the extent to which a provider is comfortable with the more immutable characteristics of a patient (Wyszewianski & McLaughlin, 2002). The exact item wording is provided in Appendix A, but Table 2 provides a summary of the items.

Dimension of Access	Availability	Accessibility	Affordability	Accommodation	Acceptability
Survey Item	Family experiences frustration in efforts to obtain health care services	Child has any kind of health care coverage	Family had problems paying child’s medical bills	Child received any type of medical care in the past 12 months	Doctor sensitive to family values and customs
Response Options	Usually/Always Sometimes Never	Yes No	Yes No	Yes No	Usually/Always Sometimes Never

Table 2. Survey Item Representation for Each Dimension of Access

Source: (2011/12 National Survey of Children’s Health)

I created the composite access measure by recoding the five survey item responses. For each of the five dimensions of access a child experienced, s/he received a 1 and the items were summed. Thus, a child could score from 0 (no access) to 5 (most access). Three survey items (“Child has any kind of health care coverage”, “Family had problems paying child’s medical bills”, and “Child received any type of medical care in the past 12 months) had a “Yes/No” response option, in which “Yes” indicated experiencing access to health care (Table 2 and Appendix A). If a parent responded “Yes” to one of these three survey items, the child received a 1 for that survey question. The other two survey items (“family experiences frustrations in effort to obtain health care services” and “doctor sensitive to family values and customs”) had three

response options: “usually/always”, “sometimes”, or “never” (Table 2 and Appendix A). In order to create an overall access to primary health care measure, a response of “never” to the survey item “family experiences frustrations in efforts to obtain health care services” was coded as experiencing access to care (i.e. a 1). For example, if the parent responded “never” to the survey question “How often have you been frustrated in your efforts to obtain health care services for your child?” the child experienced access to primary health care (i.e. a 1). In addition, if the parent responded “usually/always” or “sometimes” to the survey question “How often is the doctor sensitive to family values and customs?” the child experienced access to primary health care (i.e. a 1).

Control Variables

I included five control variables in the analysis: gender, race/ethnicity, poverty level, metropolitan statistical area (MSA) designation, and age. First, it is important to control for gender because women typically have higher access to care than men. For example, women are more likely to have a usual source for medical care than men: 80% of women had a usual source of care compared to 66% of men (Merzel, 2000). Gender is measured by a dichotomous variable coded as: 1 = Male and 2 = Female. Second, I control for race/ethnicity because minorities have less access to health care than whites. In 2010, 34% of Hispanics were uninsured compared to only 13% of Whites (American College of Physicians, 2010). I used the four dichotomous, categorical variables to capture race/ethnicity: one each for Blacks, Whites, Hispanics, and all Others. The Other variable includes Asian, American Indian, Alaska Native, Native Hawaiian, Pacific Islander, or any child who is more than one race.

Third, household income affects access to care (Centers for Disease Control, 2013). According to the CDC, 4% of non-poor children had no usual source of health care compared to

6% of children living in poverty (2013). I control for poverty status using a single, dichotomous variable. Children in households with income less than 100% of the Federal Poverty Level (FPL) are considered impoverished (poverty = 2) and children in households with income greater than 100% FPL are classified as not impoverished (poverty = 1). Fourth, I measure urban/rural status by MSA designations: those in an MSA are classified as living in an urban area. Overall, residents of rural areas generally experience decreased access to primary health care as well as poorer quality of care than residents of urban areas; therefore, MSA designation was controlled for in this study (A.D.A.M, 2012). A dichotomous variable was created to control for geographic location (rural vs. urban) and was defined as follows: 1 = urban and 2 = rural. Lastly, I controlled for the child's age. When children are younger they utilize the health care system more frequently. For instance, infants often have six visits per year compared to older children who mainly see a primary care physician for their annual checkups unless the child is ill (Simpson, et al., 1997). Age is measured by a continuous variable in years.

Analysis Approach

This study uses a cross-sectional analysis to examine the relationship between the number of ACEs and access to primary health care for children ages 0 to 17. I examined descriptive statistics to identify sample population characteristics, including variability in ACEs and access to primary health care. I ran a linear regression to estimate the relationship between the number of ACEs and overall access to primary health care, while controlling for gender, race/ethnicity, poverty level, MSA designation, and age. All analyses were conducted with SAS version 9.4.

Chapter 3

Results

Descriptive Statistics

Tables 3 and 4 provide the key characteristics of the study sample. The mean age is 8.9 years in the sample population. There are slightly more males than females: 51.5% and 48.5%, respectively. The following race/ethnicity comprises the sample population: White, non-Hispanic children (66.5%); Hispanic children (13.2%); Black, non-Hispanic children (9.3%); all Other children (11.0%). In addition, 91.5% of children live in households with income above 100% FPL and the majority (78.5%) of children live in urban areas.

The range for the access to primary health care measure was from 1 – 5 (least access = 1, limited access = 2, moderate access = 3, adequate access = 4, and most access = 5) (Table 3). No child in the sample population had 0 access to primary health care and the majority of children did not experience access problems. Specifically, 68.99% of children had the most access; 24.24% had adequate access; 5.65% had moderate access; 0.97% had limited access; and 0.15% had the least access to primary health care (Table 3). In relation to ACEs, 56.8% of the sample population experienced 0 ACEs, 23% experienced 1 ACE, and 20.2% experienced 2 or more ACEs (Table 4). This means that 38,331 children in the sample population experienced at least 1 ACE.

Table 3 provides descriptive statistics for the sample population by degree of access. Chi-square tests for independence indicated that among the different measures of access there were statistically significant differences in age, gender, race/ethnicity, poverty level, and MSA

designation. Younger children had less access to primary health care. A slightly higher percentage of females (70.0%) achieved the most access compared to males (68.2%). Also, White, non-Hispanic children (72.5%) had the most access to care compared to Black, non-Hispanic children (65.2%), Hispanic children (57.4%), and all Other children (64.9%). The majority (70.3%) of children who live in households with income above 100% FPL had the most access to care. Lastly, a higher percentage of children living in urban areas (69.3%) had the most access to care compared to children living in rural areas (66.2%).

Table 3. Sample Population Characteristics by Overall Access to Primary Health Care

	Total Sample	Composite Measure of Access				
		Least Access Access = 1	Limited Access Access = 2	Moderate Access Access = 3	Adequate Access Access = 4	Most Access Access = 5
Percent Sample Population		0.15%	0.97%	5.65%	24.24%	68.99%
Age *	Mean: 8.9 SD: 5.2	Mean: 11.8 SD: 4.0	Mean: 10.4 SD: 4.7	Mean: 9.4 SD: 5.0	Mean: 9.3 SD: 5.1	Mean: 8.7 SD: 5.3
Gender *						
Male	51.5%	0.2%	1.1%	5.8%	24.8%	68.2%
Female	48.5%	0.1%	0.9%	5.5%	23.7%	70.0%
Race/Ethnicity *						
White, non-Hispanic	66.5%	0.1%	0.6%	4.2%	22.7%	72.5%
Hispanic	13.2%	0.6%	2.6%	10.5%	28.9%	57.4%
Black, non-Hispanic	9.3%	0.2%	1.2%	7.6%	25.9%	65.2%
All Other	11.0%	0.1%	1.3%	7.0%	26.8%	64.9%
Poverty Level *						
Below 100% FPL	8.5%	0.5%	2.3%	10.8%	29.7%	56.8%
Above 100% FPL	91.5%	0.1%	0.82%	5.1%	23.7%	70.3%
MSA Designation *						
Rural	21.5%	0.1%	1.1%	6.2%	26.5%	66.2%
Urban	78.5%	0.2%	1.0%	5.8%	23.8%	69.3%
N	88771	128	846	5005	21529	61263

*Indicates significance ($p \leq 0.0001$)

Table 4 provides descriptive statistics for the sample population by number of ACEs. Even though a slightly higher percentage of males experienced 1 as well as 2 or more ACEs, chi-square tests for independence indicated there was no statistical significance in gender among the different measures of access. However, chi-square tests for independence indicated that there were statistically significant differences in age, race/ethnicity, poverty level, and MSA designation. The mean age increased as the number of ACEs increased. In addition, a higher percentage of Black, non-Hispanic children experienced 1 as well as 2 or more ACEs (29.6% and 27.7%, respectively) while the majority of White, non-Hispanic children (60.8%) experienced 0 ACEs. The majority of children living in households with income below 100% FPL (35.8%) experienced 2 or more ACEs while the majority of children living in households with income above 100% FPL (58.7%) experienced 0 ACEs. Regarding a child's MSA designation, a higher percentage of children living in rural areas experienced 1 as well as 2 or more ACEs: 24.6% and 24.9%, respectively.

Table 4. Sample Population Characteristics by Number of Adverse Childhood Experiences

	Total Population	Child Experienced 0 ACEs	Child Experienced 1 ACE	Child Experienced 2 or More ACEs
Percent of Total Population		56.8%	23.0%	20.2%
Age *	Mean: 8.9 SD: 5.2	Mean: 8.2 SD: 5.3	Mean: 9.2 SD: 5.2	Mean: 10.6 SD: 4.7
Gender				
Male	51.5%	56.6%	23.1%	20.4%
Female	48.5%	57.1%	22.9%	20.0%
Race/Ethnicity *				
White, non-Hispanic	66.5%	60.8%	21.3%	17.9%
Hispanic	13.2%	49.3%	27.4%	23.3%
Black, non-Hispanic	9.3%	42.7%	29.6%	27.7%
All Other	11.0%	53.5%	22.3%	24.2%
Poverty Level *				
Below 100% FPL	8.5%	32.6%	31.5%	35.8%
Above 100% FPL	91.5%	58.7%	22.3%	19.1%
MSA Designation *				
Rural	21.5%	50.5%	24.6%	24.9%
Urban	78.5%	57.9%	22.8%	19.2%
N	88771	50440	20404	17927

*Indicates significance ($p \leq 0.0001$)

Regression Results

Results from the linear regression are displayed in Table 5. All findings reported below were statistically significant ($p \leq 0.0001$).

These findings ultimately reveal that children who experience more ACEs have less access to primary health care. Specifically, children who experienced 1 ACE and children who experienced 2 or more ACEs had, on average, a 0.15 and 0.25 point lower access to primary health care score compared to children who experienced 0 ACEs. In addition, children who

experienced 2 or more ACEs had a 0.10 point lower access to primary health care score compared to children who experienced 1 ACE.

The study's findings also reveal that a child's race/ethnicity, age, gender, MSA designation, and poverty level have an effect on access to primary health care. Children living in households with income below 100% FPL had a 0.13 point lower access to primary health care score compared to children living in households with income above 100% FPL. In addition, Hispanic children, Black, non-Hispanic children, and all Other children had a 0.24, 0.07, 0.10 point lower access to primary health care score compared to White, non-Hispanic children. Females also had a 0.02 point lower access to primary health care score compared to males. Children living in rural areas had a 0.03 point lower access to primary health care score compared to children living in urban areas. Lastly, as age increased children had, on average, a 0.01 point lower access to primary health care score.

When considering all factors together, the linear regression reveals that children who experienced 1 ACE, children who experienced 2 or more ACEs, and Hispanic children had the largest point difference in access to primary health care. Combined these factors have a 0.64 point lower access to primary health care score compared to all other factors. In contrast, a child's age had the least impact on access to care: older children had a 0.01 point lower access to primary health care score.

Table 5. Results from Regression of Access to Primary Health Care on Adverse Childhood Experiences

Variable	No Controls		Controls	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Intercept	4.71*	0.00283	4.9*	0.01609
Child Experienced 1 ACE	-0.18*	0.00532	-0.15*	0.00674
Child Experienced 2 or More ACEs	-0.28*	0.00558	-0.25*	0.00718
Poverty Level	-	-	-0.13*	0.00957
White	-	-	Reference	-
Black	-	-	-0.07*	0.00894
Other	-	-	-0.10*	0.00941
Hispanic	-	-	-0.24*	0.00806
Female	-	-	0.02*	0.00539
Rural	-	-	-0.03*	0.00662
Age	-	-	-0.01*	0.00053211

* Indicates significance ($p \leq 0.0001$)

Chapter 4

Discussion

As hypothesized, the results show that children who experience more ACEs have less access to primary health care. Specifically, children who experienced 1 ACE as well as 2 more ACEs had a 0.15 and 0.25 point lower access to primary health care score compared to children who experienced 0 ACEs. Also, children who experienced 2 or more ACEs had a 0.10 point lower access to primary health care score compared to children who experienced 1 ACE. These findings suggest that children who experience more ACEs have less access to primary health care. A study conducted by the CDC suggested that a combination of ACEs increase a child's risk of maltreatment, which negatively impacts access to health care (CDC, 2013). My study does not test the specific mechanisms, but my findings that higher numbers of ACEs is related to less access to primary health care is consistent with this literature.

This study's findings about the relationships between race/ethnicity, age, MSA designation, and poverty level are consistent with the previous literature. On average, children living in households with income below 100% FPL had less access to primary health care compared to children living in households with income above 100% FPL. Redlener, et al. found that people with low income have fewer resources, such as lack of transportation options which affect children's access to health care (n.d). In addition, like Simpson, et al., I found that children living in rural areas, children who are Hispanic, and children who are older had less access to primary health care in this study (1997). According to a study by the Commonwealth Fund, men typically have less access to primary health care compared to females due to their behaviors and reluctance to seek a usual place of care (Sandman, et al, 2000). In contrast, this study revealed that females have less access to primary health care than males.

As stated previously, children who experience more ACEs have less access to primary health care. In this study, 43.2% of children experienced at least 1 ACE: 23% experienced 1 ACE and 20.2% experienced 2 or more ACEs. There are important long-term health and cost consequences associated with reduced access to primary health care. Reduced access to primary health care in the United States leads to poor childhood health outcomes, which have a number of long-term negative consequences as an adult, such as low socioeconomic status, more costly medical conditions, and poor health (Case & Paxson, 2006; Redlener, et al., n.d).

These findings suggest that ACEs are a risk factor that need to be considered in efforts to improve childhood wellbeing and access to primary health care for children. One option is for school districts to screen children ages 0 to 17 for ACEs to determine if a child is at risk for reduced access to primary health care. For children who are at risk, school districts should take additional steps, such as providing reminder phone calls for annual health care visits and transportation options, to ensure that children who are exposed to ACEs have sufficient access to primary health care. The findings of this study also reveal differences in MSA designation, gender, race/ethnicity, poverty level, and age in relation to ACEs. For instance, on average, a higher percentage of rural children, males, children living in households with income below 100% FPL, older children, and Black, non-Hispanic children experienced 2 or more ACEs. These differences are important to note so that school districts are knowledgeable about the types of children who may be more susceptible to experiencing a higher number of ACEs.

Second, additional efforts should be taken by health care professionals to prevent children from being exposed to ACEs. Past research has shown that “the presence of responsive, caring adults can act as a buffer against the most harmful effects of toxic stress” due to ACEs (Child Trends, 2013). Because a number of ACEs (parental substance abuse, parental

incarceration, and domestic violence) suggest that a child's parent cannot act as a buffer, public health approaches should be utilized to limit a child's exposure to ACEs. Specifically, there needs to be increased training for health care professionals working with families experiencing trauma and programs that meet the emotional needs of children who are likely to experience violence in the home (Child Trends, 2013). According to a study conducted by Child Trends, early education and family support as well as home visiting by health care professionals for first-time mothers have shown to reduce the prevalence of child abuse and neglect (2013).

Finally, we should sustain and expand policy interventions, such as health insurance coverage, to improve access to primary health care for children. The Patient Protection and Affordable Care Act (ACA) attempts to increase insurance for the uninsured, which could improve access to primary health care for children who experience socioeconomic hardship. In contrast, the ACA does not address the vast majority of ACEs that were identified in this study. By decreasing a child's exposure to ACEs, increasing pediatric health care professionals' awareness of ACEs, and taking steps to increase access to primary health care, access to primary health care for children who experience ACEs will hopefully be improved.

Chapter 5

Limitations

Although all of the results in this study were statistically significant, this study has several limitations. One significant limitation in this study is causality. The difference in access to primary health care may not be directly affected by the number of ACEs, but rather affected by other factors. Although this study controlled for gender, age, race/ethnicity, poverty level, and MSA designation, there are several other factors that affect access to health care, such as family structure, transportation, religious differences, and language barriers (Allison, 2005). These variables were not controlled for in this study because the NSCH did not collect these data. Because of this limitation, future studies should examine each of these factors in relation to a child's number of ACEs and access to primary health care. Another limitation of this study is the cross-sectional analysis. This study only provides a snap shot of results from February 25, 2011 to June 28, 2012. If another time frame was selected for this study, the situation may provide differing results.

Furthermore, self-report bias is another limitation of this study. One child from each household was randomly selected for the interview and the parent or guardian was the respondent (Blumberg, et al., 2013). Self-report bias introduces validity problems into this study. A parent or guardian may have exaggerated the child's situation to be worse or better off than it actually was. In other words, a parent or guardian could have reported that their child experienced more or fewer ACEs due to self-report bias. In relation to ACE survey questions, a parent or guardian may be more likely to underreport the seriousness of the child's situation in fear that child-protective services may intervene. Future research on ACEs and access to primary health care for children would benefit from utilizing clinical evaluations or educational records

as opposed to self-reporting telephone surveys. Lastly, only one question was used to measure each dimension of access (availability, accessibility, affordability, accommodation, and acceptability). This limited representation of the different access dimensions is another limitation of this study because more factors may better represent the different access dimensions.

Chapter 6

Conclusion

In conclusion, the relationship between ACEs and access to primary health care for children was statistically significant ($p \leq 0.0001$). Children who experienced more ACEs had less access to primary health care. Because a large percentage of children in the United States have experienced at least 1 ACE, there is reason to believe that a large percentage of children in the United States are at greater risk for inadequate access to primary health care. Lower access to primary health care as a child is directly related to poor childhood health outcomes and a decreased life expectancy. To improve health, policymakers and practitioners should consider how to improve children's living circumstances in addition to expanding health insurance. Future research should explore more comprehensive measures for each dimension of access (availability, accessibility, acceptability, accommodation, and affordability) to gain a better understanding of how ACEs translate into diminished access to primary care.

Appendix A

Access to Primary Health Care Survey Questions

National Survey of Children's Health 2011-2012

Source: (2011/12 National Survey of Children's Health)

Accessibility:

Survey Question

Does [S.C] have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicaid?

Survey Response Options

Yes

No

Accessibility:

Survey Question

During the past 12 months/since [his/her] birth, did [child name] see a doctor, nurse, or other health care professional for any kind of medical care, including sick-child care, well-child check-ups, physical exams, and hospitalizations?

Survey Response Options

Yes

No

Affordability:

Survey Question

In the past 12 months did your family have problems paying or were unable to pay any of [S.C.]'s medical bills? Include bills for doctors, dentists, hospitals, therapists, medication, equipment, or home care.

Response Options

Yes, had problems pay for child's medical bills

No problems

Availability:*Survey Question*

[During the past 12 months / [WHEN S.C. IS YOUNGER THAN 12 MONTHS] Since [his/her] birth], how often have you been frustrated in your efforts to obtain health care services for [S.C.]?

Response Options

Usually/Always

Sometimes

Never

Acceptability:*Survey Question*

When [S.C.] is seen by doctors or other health care providers, how often are they sensitive to your family's values and customs?

Response Options

Usually/Always

Sometimes

Never

Appendix B

Adverse Childhood Experiences Survey Questions

National Survey of Children's Health 2011-2012

Source: (2011/12 National Survey of Children's Health)

(1) Survey Question

Since [S.C.] was born, how often has it been very hard to get by on your family's income, for example, it was hard to cover the basics like food or housing? Would you say often, somewhat often, not very often, or never?

Response Options

Often

Somewhat Often

Not Very Often

Never

(2) Survey Question

Did [S.C.] ever live with a parent or guardian who got divorced or separated after [S.C.] was born?

Response Options

Yes

No

(3) Survey Question

Did [S.C.] ever live with a parent or guardian who died?"

Response Options

Yes

No

(4) Survey Question

Did [S.C.] ever live with a parent or guardian who served time in jail or prison after [S.C.] was born?

Response Options

Yes

No

(5) Survey Question

Did [S.C.] ever see or hear any parents, guardians, or any other adults in [his/her] home slap, hit, kick, punch, or beat each other up?

Response Options

Yes

No

(6) Survey Question

Was [S.C.] ever the victim of violence or witnessed any violence in [his/her] neighborhood?

Response Options

Yes

No

(7) Survey Question

Did [S.C.] ever live with anyone who was mentally ill or suicidal, or severely depressed for more than a couple of weeks?

Response Options

Yes

No

(8) Survey Question

Did [S.C.] ever live with anyone who had a problem with alcohol or drugs?"

Response Options

Yes

No

(9) Survey Question

Was [S.C.] ever treated or judged unfairly because of [his/her] race or ethnic group?

Response Options

Yes

No

Appendix C

SAS Input

```

libname mb "V:\My Documents\Thesis";

run;

data oct9;
set mb.nsch;

/*Coded access variables*/

if K3Q01 in (6,7) then K3Q01 = .M;
if K3Q01 = 0 then K3Q01 = 0;
if K3Q01 = 1 then K3Q01 = 1;
label K3Q01 = "Indicator 3.1: Does [S.C.] have any kind of health care
coverage, including health insurance, prepaid plans such as HMOs, or
government plans such as Medicaid?";

if K3Q25 in (6,7,.M) then K3Q25 = .M;
if K3Q25 = 1 then K3Q25 = 0;
if K3Q25 = 0 then K3Q25 = 1;
if K3Q25 = 2 then K3Q25 = 0;
label K3Q25 = "Indicator 4.10: Family had problems paying or were
unable to pay for child's medical bills in past 12 month";

if C4Q04 > 1 then C4Q04 = 0;
if C4Q04 = 1 then C4Q04 = 1;
if C4Q04 in (6,7,.M) then C4Q04 = .M;
label C4Q04 = "Indicator 4.11: How often have you been frustrated in
efforts to obtain health care
services for child";

if K5Q42 in (6,7,.M,.L) then K5Q42 = .M;
else if K5Q42 = 1 or K5Q42 = 2 then K5Q42 = 0;
else if K5Q42 = 3 or K5Q42 = 4 then K5Q42 = 1;
label K5Q42 = "Indicator 4.8: How often doctor sensitive to family
values and customs";

if S4Q01 in (6,7,.M) then S4Q01 = .M;
else if S4Q01 = 1 then S4Q01 = 1;
else if S4Q01 = 0 then S4Q01 = 0;
label S4Q01 = "Indicator 4.1a: Child received ANY kind of medical care
in past 12 months";

if K3Q01 = .M then delete;
else if K3Q25 = .M then delete;
else if C4Q04 = .M then delete;
else if K5Q42 = .M then delete;
else if S4Q01 = .M then delete;

/* If we use the sum() function, any missing values will be
treated as though they were zero, and the new variable will be

```

```

equal to missing only if all of the variables listed are missing. */

access2= sum(of K3Q01 K3Q25 C4Q04 K5Q42 S4Q01);

/*Coded ACE variables*/

ACEincome2_11 = .;
if ACE1 in (1,2) then ACEincome2_11 = 1;
if ACE1 in (3,4) then ACEincome2_11 = 0;
if ACE1 in (6,7,.M,.P) then ACEincome2_11 = .M;
label ACEincome2_11 = "How often has it been hard to get by on your
family's income - hard to cover basics like food or housing?";

ACEdivorce_11 = ACE3;
label ACEdivorce_11 = "Child lived with parent who got
divorced/separated after he/she was born";

ACEdeath_11 = ACE4;
label ACEdeath_11 = "Child lived with parent who died";

ACEjail_11 = ACE5;
label ACEjail_11 = "Child lived with parent who served time in jail
after he/she was born";

ACEdomviol_11 = ACE6;
label ACEdomviol_11 = "Child saw parents hit, kip, slap, punch or beat
each other up";

ACeneighviol_11 = ACE7;
label ACeneighviol_11 = "Child was a victim of violence or witness
violence in his/her neighborhood";

ACEmhealth_11 = ACE8;
label ACEmhealth_11 = "Child lived with anyone who was mentally ill or
suicidal, or severity depressed for more than a couple weeks";

ACEdrug_11 = ACE9;
label ACEdrug_11 = "Child lived with anyone who had a problem with
alcohol or drugs";

ACEdiscrim_11 = ACE10;
label ACEdiscrim_11 = "Child was ever treated or judged unfairly
because of his/her race or ethnic group";

array recode8 {*} ACEdivorce_11 ACEdeath_11 ACEjail_11 ACEdomviol_11
ACeneighviol_11 ACEmhealth_11 ACEdrug_11 ACEdiscrim_11;
do i=1 to dim(recode8);
if recode8(i) in (6,7,.P,.M) then recode8(i)= .M;
end; drop i;

AFESct_11 = 0;
if ACEincome2_11 = 1 then AFESct_11 + 1;
if ACEdivorce_11 = 1 then AFESct_11 + 1;
if ACEdeath_11 = 1 then AFESct_11 + 1;
if ACEjail_11 = 1 then AFESct_11 + 1;
if ACEdomviol_11 = 1 then AFESct_11 + 1;

```

```

if ACEneighviol_11 = 1 then AFESct_11 + 1;
if ACEmhealth_11 = 1 then AFESct_11 + 1;
if ACEdrug_11 = 1 then AFESct_11 + 1;
if ACEdiscrim_11 = 1 then AFESct_11 + 1;

/*if ACEincome2_11 = .M and ACEdivorce_11 = .M and ACEdeath_11 = .M and
ACEjail_11 = .M and
ACEdomviol_11 = .M and
ACEneighviol_11 = .M and ACEmhealth_11 = .M and ACEdrug_11 = .M and
ACEdiscrim_11 = .M then
AFESct_11 = .M;*/

if ACEincome2_11 in (6,7,.M,.P) and ACEdivorce_11 in (6,7,.M,.P) and
ACEdeath_11 in (6,7,.M,.P) and ACEjail_11 in (6,7,.M,.P)
and ACEdomviol_11 in (6,7,.M,.P) and ACEneighviol_11 in (6,7,.M,.P) and
ACEmhealth_11 in (6,7,.M,.P) and
ACEdrug_11 in (6,7,.M,.P)
and ACEdiscrim_11 in (6,7,.M,.P) then AFESct_11 = .M;
label AFESct_11 = "Number of Adverse Family Experiences for child, of 9
asked about";
ind6_11_11 = .;

if AFESct_11 = 0 then ind6_11_11 = 0;
if AFESct_11 = 1 then ind6_11_11 = 1;
if AFESct_11 > 1 then ind6_11_11 = 2;
if AFESct_11 = .M then ind6_11_11 = .M;
label ind6_11_11 = "Indicator 6.11: Number of Adverse Family
Experiences for child, of 9 asked about";

acemore= ind6_11_11;

if acemore = .M then delete;

if acemore = 0 then acemore0 = 1;
else acemore0 = 0;

if acemore = 1 then acemore1 = 1;
else acemore1 = 0;

if acemore = 2 then acemore2= 1;
else acemore2 = 0;

if HISPANIC = 0 and RACER = 0 then race4_11 = 1;
if HISPANIC = 0 and RACER = 1 then race4_11 = 2;
if HISPANIC = 0 and RACER = 2 then race4_11 = 3;
if HISPANIC = 0 and RACER = 3 then race4_11 = 4;
if HISPANIC = 1 then race4_11 = 1;
if race4_11 = . then race4_11 = .M;
label race4_11 = "Race and ethnicity of child";

if race4_11 = 1 then hispanic1 = 1;
else hispanic1 = 0;

if race4_11 = 2 then white = 1;
else white = 0;

```

```

if race4_11 = 3 then black = 1;
else black = 0;

if race4_11 = 4 then multiracial = 1;
else multiracial = 0;

sex_11 = SEX;
if sex_11 in (6,7) then sex_11 = .M;
label sex_11 = "Sex of child";

povlev4_11 = .;
if POVERTY_LEVELR in (1) then povlev4_11 =1;
if POVERTY_LEVELR in (2,3,4,5) then povlev4_11 =2;
if POVERTY_LEVELR in (6,7) then povlev4_11 =3;
if POVERTY_LEVELR in (8) then povlev4_11 =4;
label povlev4_11 = "Derived. Household income level based on DHHS
guidelines - Imputed; single
imputation using version 3";

ind6_5_11 = .;
if 0 < povlev4_11 <=4 and ((K11Q50 = 0) or (K11Q50 = 1)) then poverty =
1;
if povlev4_11 = 1 and K11Q50 = 1 then poverty = 2;
if K11Q50 in (6,7,.M,.P) then poverty = .M;
label ind6_5_11 = "Indicator 6.5: Children live in working poor
households--parents employed full-time with
income less than 100% FPL (using version 3 of imputed income)";

if poverty = .M then delete;
if MSA_Stat = .M then delete;
if sex_11 = .M then delete;
if race4_11 = .M then delete;

RUN;

/*Checking the frequency of the independent and dependent variables*/

proc freq;
tables K3Q01 S4Q01 K3Q25 C4Q04 K5Q42;
run;

proc freq;
tables ACEincome2_11 ACEdivorce_11 ACEdeath_11 ACEjail_11 ACEdomviol_11
ACEmhealth_11 ACEdrug_11 ACEdiscrim_11 ACEneighviol_11;
run;

/*Checking the frequency of the control variables*/

proc freq;
tables sex_11;
run;

proc freq;
tables white black multiracial hispanic;
run;

```

```

proc freq;
tables poverty;
run;

proc freq;
tables MSA_Stat;
run;

/*Re-checking access variables because there was no 0*/

proc print;
var K3Q01 S4Q01 K3Q25 C4Q04 K5Q42;
RUN;

/*Running the linear regression w/o controls*/

proc reg;
model access2 = acemore1 acemore2;
run;

/*Running the linear regression w controls*/

proc reg;
model access2 = acemore1 acemore2 poverty white black multiracial
sex_11 MSA_Stat;
run;

/*Running descriptive statistics*/

proc freq;
tables (sex_11 white black hispanic multiracial MSA_Stat
poverty)*acemore;
run;

proc freq;
tables (sex_11 white black hispanic multiracial MSA_Stat poverty)*
access2;
run;

/*checking significance of descriptive statistics*/

proc freq;
tables (AGEYR_Child sex_11 white black hispanic multiracial MSA_Stat
poverty)* access2/ chisq;
run;

proc freq;
tables (AGEYR_Child sex_11 white black hispanic multiracial MSA_Stat
poverty)* access2/ chisq;
run;

```

```
proc means;  
var AGEYR_Child;  
class acemore;  
run;
```

```
proc ttest;  
var acemore1 acemore2;  
run;
```

```
proc freq;  
tables poverty;  
run;
```

```
proc freq;  
tables white black hispanic multiracial;  
run;
```

```
proc freq;  
tables race4_11;  
run;
```


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ACADEMIC VITA

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Education

The Pennsylvania State University	University Park, PA
The Schreyer Honors College	Expected May 2015
Bachelor of Science, Health Policy and Administration	
Master of Health Administration	

Honors and Awards

Dean's List	Fall 2010 – Fall 2014
Fasola Family Honors Scholarship	Spring 2013

Association Memberships/Activities

Pennsylvania State University Club Tennis	2010 – 2013
Health Policy and Administration Club	
Schreyer Consulting Group	

Professional Experience

St. Clair Hospital	Pittsburgh, PA
<i>Administrative Resident</i>	Summer 2014
<ul style="list-style-type: none">Assisted the senior management team during the strategic planning processAnalyzed data specific to market share, inpatient utilization trends, medical staff, and transfers for the hospital strategic planCompleted observations in various departments to expand my knowledge of hospital operations	

Donald D. Wolff, Jr. Center for Quality, Safety and Innovation
at UPMC

Pittsburgh, PA
Summer 2013

Quality Improvement Summer Associate

- Assisted in projects to reduce catheter associated urinary tract infections and observation patient length of stay
- Completed observations at various UPMC Hospitals to aid in quality improvement projects
- Compiled and presented departmental bi-weekly updates to fellow summer associates

Magee-Womens Hospital of UPMC

Pittsburgh, PA
Summer 2012

Patient Information Coordinator (Birth Registry)

- Interviewed on average 25 new mothers a day for the completion of birth certificates
- Managed frequent requests from patients in a timely manner
- Assured the correct entry of birth certificate information

Leadership

UPMC Summer Associate

Pittsburgh, PA
Summer, 2013

Quality/Legal/Supply Chain Communication Co-Chair

- Facilitated summer associated discussions at executive events
- Produced the summer associated promotional video with Fellow communication chairs