Citizenship and Health in the United States: What Can We Learn from Children in Mixed-Status Families?

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Dedication

To my Grandma Nancy

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Abstract of Dissertation

Citizenship and Health in the United States: What Can We Learn from Children in Mixed-Status Families?

Within the research on immigrants' health outcomes there is limited examination of how lack of citizenship adversely affects children's Medicaid/CHIP coverage, access to care and health status in the United States. This dissertation pools data from the National Health Interview Survey from 2008 to 2015 on mixed-status families—families with at least one child that is a U.S. citizen and at least one child that is not a U.S. citizen—and employs family level fixed-effects to isolate the impact of noncitizenship (i.e. lack of U.S. citizenship) on children's health, healthcare access and insurance coverage. After controlling for observable and unobservable characteristics shared across children living in the same family as well as age and gender, lack of U.S. citizenship lowered a child's probability of being in excellent or very good health and of being covered by Medicaid/CHIP, and noncitizenship increased a child's probability of experiencing delays in needed care due to cost. Although the author was unable to distinguish between children by their immigration status, results suggest that foreign-born children without U.S. citizenship do not exhibit health advantages relative to their native-born kin. At the same time, noncitizen children are disadvantaged in accessing needed healthcare services. The long-term public cost and public health implications resulting from these children's experiences merit further examination.

Table of Contents

Dedication ..... **iv**

Acknowledgments ..... **v**

Abstract of Dissertation ..... **vi**

Chapter 1: Introduction 1

Chapter 2: Literature Review and Conceptual Framework 5

2.1 U.S. Citizenship, Immigration Statuses, Mixed-Status Families and Public Health Insurance Programs: Definitions 5

2.2 The Social Determinants of Health Conceptual Framework 7

2.3 Theory of Action 9

2.3.1: Pathways to U.S. Citizenship for Foreign-Born Individuals 11

2.3.2 Medicaid/CHIP Eligibility Restrictions 13

2.4 The Healthy Immigrant Paradox 15

2.5 Healthcare Cost Containment in the United States, Lack of Insurance and Delays in Care Due to Cost 18

2.5.1 Approach to Healthcare Cost Containment in the United States 18

2.5.2 Employer-Provided Health Insurance 20

2.5.3 Financial Barriers to Healthcare and Consequences for Health 21

2.6 Noncitizen Children's Lack of Public Health Insurance 22

Chapter 3: Methods 24

3.1 Data Source 25

3.1.1 NHIS Sample Design 25

3.1.2 Families in NHIS 27

3.1.3 NHIS Non-Response 28
3.2 Independent and Dependent Variables 29
3.2.1 Selection of Independent Variables for Analyses 30
3.2.2 Examining the Healthy Immigrant Paradox 31
3.2.3 Examining Delay of Needed Care Due to Cost 34
3.2.4 Examining Public Health Insurance 35
3.3 Identification Strategy 36
3.3.1 Descriptive and Predictive Statistics 37
3.3.2 Model Specification 39
3.3.3 Standard Errors and Variance 39
3.3.4 Sample for Analysis 40
3.3.5 Description of Mixed-Status Family Sample 43
3.4 Interpretation and Validity Issues 45
3.4.1 Issues of Coefficient Interpretation 45
3.4.2 Internal Validity of Identification Strategy 46
3.4.3 External Validity 48
Chapter 4: Results 50
4.1 Does Reported Excellent or Very Good Health Differ by Children's Citizenship Status? 50
4.1.1 Health Status and Physical Limitations 50
4.1.2 Socioeconomic Factors Associated with the "Healthy Immigrant Paradox": Poverty, Gender, Race, Ethnicity & Age 52
4.1.3 Does Health Differ by Children's Citizenship Status in Mixed Status Families? ... 58

4.2 Is Needed Healthcare More Frequently Delayed Due to Cost for Noncitizen Children than for Citizen Children? 60
4.2.1 Delays in Children's Needed Care Due to Cost by Poverty Level 61
4.2.2 Uninsured Children's Delays in Needed Care Due to Cost 62
4.2.3 Within mixed-status families, is needed healthcare more frequently delayed due to cost for noncitizen children than for citizen children? 64
4.3 Are noncitizen children less likely to be publicly insured than citizen children? 66
4.3.1 Uninsurance and Children's Poverty Level 66
4.3.2 Non-Poor Children's Insurance Composition 68
4.3.3 Poor Children's Insurance Composition 69
4.3.5 Poor Children's Region of Residence and Public Health Insurance Coverage 71
4.3.6 Within mixed-status families, are noncitizen children less likely to be publicly insured than citizen children? 73
Chapter 5: Discussion 75
5.1 Dissertation Approach 75
5.2 Reported Health Status 77
5.3 Delay in Care Due to Cost 79
5.4 Public Health Insurance 80
5.5 Policy Implications and Recommendations for Future Research 82
Bibliography 85

List of Figures

Figure 2-1: Adapted Conceptual Framework 11

Figure 2-2: Immigrant Share of Population vs. Naturalization Petition Denials, 1930 – 2016..... 12

Figure 2-3: Share of Children Without Insurance, 2017..... 23

Figure 2-4: Share of Low-Income Children (Younger than 17) With Any Office-Based Medical Visit in the Year Prior, 2010..... 23

Figure 3-1: NHIS Sample Design..... 27

Figure 3-2: Assumptions for Power Analysis, PowerUp! Software..... 41

Figure 4-1: Model Specifications for Logistic Regressions on Excellent/Very Good Health Status..... 58

Figure 4-2: Model Specifications for Logistic Regressions on Delay of Care Due to Cost..... 64

Figure 4-3: Map of United States, Color-Coded by Region, Call-Out Boxes Show Percent of Poor Children that Lack U.S. Citizenship..... 71

Figure 4-4: Model Specifications for Logistic Regressions on Excellent/Very Good Health Status..... 73

List of Tables

Table 3-1: Family Response Rates and Sample Size Per Year, 2008-2015 28

Table 3-2: Response Rates, per Variable, by Survey Year 30

Table 3-3: Children Response Rates for Dependent and Independent Variables 43

Table 3-4: Mixed-Status Families in Sample, by Year 43

Table 3-5: Mixed-Status Families, by Number of Children 44

Table 3-6: Mixed-Status Families, by Age Category Dyads, by Number of Children 44

Table 4-1: Health Status, Citizen Children vs. Noncitizen Children, 2008 – 2015 50

Table 4-2: Health Status, Noncitizen Children Living in Mixed-Status vs. Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015 51

Table 4-3: Health Status, Poor Citizen Children vs. Poor Noncitizen Children, 2008 – 2015 53

Table 4-4: Health Status, Poor Noncitizen Children Living in Mixed-Status Families vs. Poor Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015 53

Table 4-5: Racial and Ethnic Distributions, Citizen Children vs. Noncitizen Children, 2008 – 2015 54

Table 4-6: Racial and Ethnic Distributions, Noncitizen Children Living in Mixed-Status Families vs. Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015 55

Table 4-7: Excellent/Very Good Health Status, for Racial Groups and Ethnicity, Citizen vs. Noncitizen Children, 2008 – 2015 55

Table 4-8: Children's Age Distribution, by Citizenship Status, 2008 – 2015 56

Table 4-9: Children's Excellent/Very Good Health Status, for Age Groups and by Citizenship Status, 2008 – 2015 56
Table 4-10: Noncitizen Children's Age Distribution, Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015 57
Table 4-11: Age Distribution, Noncitizen Children Living in Mixed-Status Families vs. Uniform Noncitizen Status Families, 2008 – 2015 58
Table 4-12: Excellent/Very Good Health Among Children in Mixed-Status Families, Family Level Fixed Effects, Marginal Effects 59
Table 4-13: Excellent/Very Good Health Among Children in Poor Mixed-Status Families, Within Family Fixed-effects, Marginal Effects 60
Table 4-14: Children Delay of Needed Care Due to Cost, by Poverty Level and Citizenship, 2008 – 2015 61
Table 4-15: Delay of Needed Care Due to Cost, by Poverty Level, Noncitizen Children Living in Mixed-Status Families vs. Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015 62
Table 4-16: Shares of Uninsured Children's Delay of Needed Care Due to Cost, by Poverty Level and Citizenship Status, 2008 – 2015 63
Table 4-17: Shares of Uninsured Noncitizen Children's Delay of Needed Care Due to Cost, by Poverty Level and Mixed-Status or Uniform Noncitizen Status Families, 2008 – 2015 63
Table 4-18: Delay in Needed Care Due to Cost, Children in Mixed-Status Families, Within Family Fixed-effects, 2008 – 2015 65

Table 4-19: Delay in Needed Care Due to Cost, Poor Children in Mixed-Status Families, Within Family Fixed-effects, 2008 – 2015 66
Table 4-20: Percentage of Uninsured Children, by Poverty Level and Citizenship Status, 2008 – 2015 67
Table 4-21: Shares of Uninsured Noncitizen Children, by Poverty Level and Living in Mixed-Status or Uniform Noncitizen Status Families, 2008 – 2015 67
Table 4-22: Uninsurance, Children in Mixed-Status Families, Within Family Fixed-effects, 2008 – 2015 68
Table 4-23: Nonpoor Children's Insurance Composition, by Citizenship Status, 2008 – 2015 68
Table 4-24: Nonpoor Noncitizen Children's Insurance Composition, Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015 69
Table 4-25: Poor Children's Insurance Composition, by Citizenship Status, 2008 – 2015 70
Table 4-26: Poor Noncitizen Children's Insurance Composition, Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015 70
Table 4-27: Poor Children's Public Health Insurance Coverage, by Different Regions of the United States and Citizenship Status, 2008 – 2015 72
Table 4-28: Poor Noncitizen Children's Public Health Insurance Coverage, by Different Regions of the United States and Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015 73
Table 4-29: Public Health Insurance Coverage, Family Level Fixed Effects, Marginal Effects 74

Chapter 1: Introduction

As of 2014, there were an estimated 2.1 million foreign-born children living with at least one immigrant parent in the United States and the vast majority (79%) were not citizens (The Urban Institute, 2018). Existing research points to lack of U.S. citizenship as adversely affecting children's health status, access to care, and health insurance coverage in the United States (Antecol & Bedard, 2006; Markides & Rote, 2019; Singh, Rodriguez-Lainz, & Kogan, 2013; Berchick, Hood, & Barnett, 2018; Ku & Jewers, 2013). In this dissertation, the author posits that *foreign-born children's opportunities to gain U.S. citizenship,* combined with *eligibility restrictions on Medicaid/CHIP by citizenship status for persons of all ages* are fundamental causes for disparities in health outcomes, access to care and health insurance coverage between noncitizen and citizen children in the United States. Changing these policies might be potent in improving health, healthcare access and insurance coverage for foreign-born children from diverse racial/ethnic and socioeconomic backgrounds living in the United States (Lay-Yee, Milne, Davis, Pearson, & McLay, 2015).

In this dissertation, the author aims to isolate the impact of lack of U.S. citizenship (i.e. noncitizenship) on health, healthcare access and health insurance coverage for noncitizen children living in mixed-status families—defined here as families where one or more children have U.S. citizenship while one or more do not have citizenship. Specifically, she addresses three research questions:

1. *Within mixed-status families, does reported health status differ by children's citizenship status?* Answering this question will build on our current knowledge of the "healthy immigrant paradox", which suggests that

immigrants, particularly recent arrivals, are healthier than their native-born counterparts but that immigrants' health advantages deteriorate the longer they live in their host countries (National Academies of Sciences, Engineering and Medicine, 2015).

2. *Within mixed-status families, is needed healthcare more frequently delayed due to cost for noncitizen children than for citizen children?* Answering this question builds on existing studies, which have reported that foreign-born children (who are also likely to lack U.S. citizenship) experience low rates of office-based visits, lack a usual source of care, and have uneven access to preventative healthcare across states (Ku & Jewers, 2013; Yu, Huang, & Kogan, 2008; Huang, Yu, & Ledsky, 2006).
3. *Within mixed-status families, are noncitizen children less likely to be publicly insured than citizen children?* Although a very small share of children in the United States lack health insurance, health insurance rates differ depending on children's citizenship (Khullar & Chokshi, 2019). Noncitizen children, as a group, have lower insurance coverage compared to groupings of children based on race, ethnicity or poverty (Berchick, Hood, & Barnett, 2018). Answering this question will illustrate the extent to which noncitizen children's low health insurance coverage is due to lack of public health insurance.

The author's approach to her research questions was guided by the Social Determinants of Health (SDOH) conceptual framework, which considers social and political contexts, structural mechanisms that reproduce inequalities, and immediate

factors that generate and perpetuate disparities in health outcomes (Castañeda, et al., 2015; National Academies of Sciences, Engineering and Medicine, 2018; Solar & Irwin, 2010). With few exceptions, children are automatically granted citizenship after their parents naturalize (Rytina, 2013). However, procedures for becoming naturalized citizens from immigration statuses have become more complicated and costlier for individuals (Massey & Pren, 2012). At the same time, policies and programs in the United States systematically afford different benefits and supports according to residents' citizenship status, regardless of a person's age (Fix & Zimmermann, 1999; Castañeda & Melo, 2014). Guided by the SDOH framework and informed by research on naturalization and social assistance policy, the author's theory of action is that lengthening time spent in the United States without citizenship combined with noncitizens' exclusion from social assistance drive disparities in health, healthcare access, and public health insurance coverage between citizen and noncitizen children.

To test her theory of action, the author employed within-family analyses. She uses family level fixed-effects as her identification strategy to isolate the relative importance of U.S. citizenship on children's health status, delays in needed care due to cost and public health insurance coverage within mixed-status families. The identification strategy in this dissertation builds upon the approach used by Percheski & Bzostek (2013), which revealed that individuals' insurance status can differ within one family, and children's health insurance coverage has implications for children's access to healthcare. This dissertation differs from Percheski & Bzostek (2013) in that the author isolates citizenship as a driver for health status, after controlling for being uninsured.

The three research questions were answered using national data collected in the National Health Interview Survey (NHIS) from 2008 to 2015. Per these NHIS data, children made up a quarter of the United States' population, and approximately 1,777,947 of children were not U.S. citizens. The author presents descriptive results across all children by citizenship status; next, descriptive results are shown for noncitizen children by those living in a mixed-status (defined in this dissertation as families where at least one child was not a citizen and at least one child was a U.S. citizen) or uniform noncitizen status family (defined here as families where all of the members lacked U.S. citizenship). For her estimators using family level fixed-effects, the author pooled data from 2008 to 2015 to create a sample of mixed-status families over seven times the predicted size needed per a power analysis.

The dissertation is arranged in four parts. The second chapter provides definitions of key concepts as well as a synthesis of the relevant research. The author describes her methods in Chapter 3 and her findings in Chapter 4. The final chapter of the dissertation lays out major conclusions, limitations of the study and recommendations for future research and policies.

Chapter 2: Literature Review and Conceptual Framework

2.1 U.S. Citizenship, Immigration Statuses, Mixed-Status Families and Public Health Insurance Programs: Definitions

U.S. Citizenship: Citizenship infers membership to a group and a relationship with the government that affords individuals rights and responsibilities (Bosniak, 2006). The United States grants citizenship through *jus soli*, which is by birthplace, and *jus sanguinis*, which is through naturalization (Findlaw: Thomson Reuters, 2019). Children born within the United States, regardless of parental immigration status, are U.S. citizens through birth (Woods & Hanson, 2016). Unlike U.S.-born children of immigrant parents living in the United States, foreign-born children's ability to be U.S. citizens is determined by their parents' immigration status (Thronson, 2006-2007). With few exceptions, foreign-born children are automatically granted citizenship after their foreign-born parents gain citizenship through naturalization (Rytina, 2013).

Immigration Statuses: Foreign-born people in the United States can possess temporary or permanent immigration statuses. Noncitizen foreign-born children living with immigrant parents in the United States derive their immigration status from their parents, which can include legal permanent residency, refugee or asylee. Children may be deemed ineligible to derive legal permanent residency status from their parents if they are not legally eligible to accompany their parents, are stepchildren, or if their parents fail to meet sponsorship financial requirements (National Institutes of Health, 2011). Temporary immigration statuses include visas for work, tourism, business and residency that have no pathway to citizenship. Temporary Protected Status (TPS) and H1-B visas are two examples of temporary (or non-immigration) statuses where people are authorized to live

and work in the United States on a non-permanent basis. Some immigrants do not possess an immigration status and are unauthorized to reside or work in the United States. The author refers to people who live and work in the United States without an authorized immigration status to do so as undocumented immigrants. Foreign-born children of undocumented immigrant parents are likely to also be undocumented immigrants.

Mixed-Status Families: Mixed-status families are defined as families where one or more members possess U.S. citizenship, but others do not (Rodriguez, 2018). In 2014 there were an estimated 2.1 million foreign-born children living with at least one immigrant parent in the United States; over three-quarters (79%) of foreign-born children living in mixed-status families were not citizens (The Urban Institute, 2018). While the literature often refers to mixed-status families as being composed of immigrant parents with U.S. citizen children, both foreign-born children and foreign-born adult members of mixed-status families can possess a variety of immigration statuses or be undocumented (Fix & Zimmermann, 1999). Estimates from 1998 showed that mixed-status families accounted for 9 percent of all families with children and 14 percent of all poor families with children (Fix & Zimmermann, 1999). Qualitative research on mixed-status families has found that differences in citizenship between siblings can create emotional and material divides between siblings due to access to driver's license, post-secondary education and, for poor families, access to healthcare (Schueths & Lawston, 2015).

Public Health Insurance Programs: Medicaid and CHIP (Children's Health Insurance Program) are means-tested federal/state partnerships; the federal government provides matching funds to states for Medicaid and CHIP enrollees that meet federal eligibility criteria. Medicaid and CHIP are insurance providers for 37 percent of all

children in the United States and cover seven of every ten children living at or below 100 percent of the federal poverty line (Rudowitz, Artiga, & Arguello, 2014). Medicaid was established in 1965 as a primary public insurance program to cover low-income and poor families, disabled individuals, seniors and children in the United States (Rudowitz, Garfield, & Hinton, 2019; Center for Budget and Policy Priorities, 2016). CHIP was established in 1997 to extend public health insurance to children (ages 0 to under 18) in families with incomes that exceeded Medicaid's income eligibility limits but who remained uninsured (Children's Defense Fund, 2005). Medicaid and CHIP coverage of services varies by state but must comply with the overall goals for the programs (Center for Budget and Policy Priorities, 2016). The 1967 Social Security Act Amendment for Medicaid mandated an Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit for children covered by Medicaid or CHIP in order to catch and treat childhood conditions before they result in serious or long-term harm (Medicaid and CHIP Payment and Access Commission, 2019).

2.2 The Social Determinants of Health Conceptual Framework

The author's approach to her research was guided by the Social Determinants of Health (SDOH) conceptual framework, which considers social and political contexts, structural mechanisms that reproduce inequalities, and immediate factors that generate and perpetuate disparities in health outcomes (Castañeda, et al., 2015; National Academies of Sciences, Engineering and Medicine, 2018; Solar & Irwin, 2010). The SDOH conceptual framework overlaps with several health disparity theories—including the Fundamental Causes and Pathways models—that examine the relationship between

socioeconomic factors and health outcomes and healthcare access. These models focus on how access to resources and environmental stresses interact with individual genetic and behavioral risks to create and perpetuate disparities in health (Roux, 2012). The Fundamental Causes model originated in psychology; Williams (1985) laid out how members of different racial and ethnic groups have stratified health outcomes and health vulnerabilities due to their socioeconomic status (Williams, 1990). Link and Phelan took a broader approach than Williams; they posited that health outcomes and vulnerabilities are not only stratified by social, economic and racial contexts but also drive persistent poor health outcomes (Link & Phelan, 1995). Similar to the Fundamental Causes model, the Pathways approach contends that socioeconomic stratification reproduces inequalities (Torres & Young, 2016). The Pathways model differs from Fundamental Causes in laying out a more linear process for disparities: different endowments of resources and privilege as well as environmental stressors set individuals on different pathways of health outcomes (Roux, 2012).

Despite overlapping with other theories, the SDOH conceptual framework is substantively innovative in at least four ways. First, research on the social determinants of health directly questions inequities in health outcomes. Second, researchers guided by the SDOH conceptual framework seek to explain why public policy does not correct inequalities over time. To do this, the framework looks outside individual and family characteristics and behaviors and includes social and political contexts in analyzing health disparities (Solar & Irwin, 2010). Third, the framework relies on data that center on different populations' experiences that translate into risk factors for health outcomes (Green & Zook, 2019). Finally, data analysis is meant to identify how government's

decisions exacerbate or mitigate risks for adverse health outcomes among vulnerable populations.

2.3 Theory of Action

The author builds on recent calls among researchers and practitioners to consider immigration as a social determinant of health (National Academies of Sciences, Engineering and Medicine, 2018). Different stakeholders have defined social determinants of health slightly differently (Hosseini Shokouh, et al., 2017). For the purposes of this dissertation, the author uses the formulation established by Krieger (2001), which states: "Social determinants of health refer to both specific features of and pathways by which societal conditions affect health and that potentially can be altered by informed action" (Krieger, 2001).

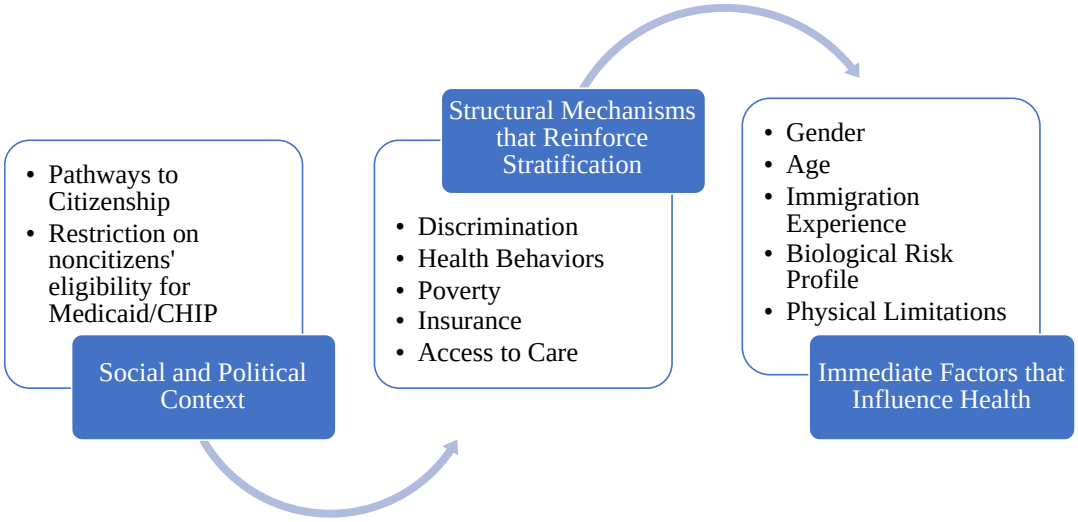
The extent to which noncitizenship negatively impacts children's health is largely due to policy decisions in the United States. The United States neither has a domestic legal framework nor is a party to international covenants that preserve certain rights to children regardless of a child's citizenship status in the law (Ruiz-Casares, Rousseau, Derluyn, Watters, & Crepeau, 2010; Collins, 2012). A "…host of constitutional and statutory provisions rest on the premise that a legitimate distinction between citizens and aliens may justify attributes and benefits for one class not accorded to the other" (*Diaz v. Mathews,* 1976). Today, policies and programs systematically afford different benefits and supports according to a U.S. resident's citizenship status, regardless of a person's age (Fix & Zimmermann, 1999; Castañeda & Melo, 2014). In the last decade, children without U.S. citizenship have been direct targets of exclusionary policies (Perreira &

Pedroza, 2019). Although the Supreme Court acknowledged in *Plyler v. Doe* (1982) that undocumented children "…can neither affect their parents' conduct nor their own undocumented status..." the Court did not assign a higher level of scrutiny to policies that sought to deny undocumented children public elementary education.

The author posits that *foreign-born children's opportunity to gain U.S. citizenship,* combined with *eligibility restrictions on Medicaid/CHIP by citizenship status for persons of all ages* are fundamental causes for disparities in health outcomes, access to care and public health insurance coverage in the United States between noncitizen and citizen children (Figure 2-1). The theory of action employed in this dissertation within the SDOH conceptual framework is as follows:

- Federal policies create stratifications in health outcomes and healthcare access between noncitizen and citizen children through two main channels: noncitizen children's pathways to citizenship and Medicaid/CHIP eligibility restrictions based on immigration status.
- Within this larger context, children's familial income, housing and safety, immediate differences in noncitizen and citizen children's insurance coverage, access to care, as well as larger discrimination noncitizen children experience due to their race/ethnicity, language, gender and years living in the United States contribute to overall health outcomes.
- Finally, biological factors, such as age and gender, and the experience of migrating to the United States play a role in noncitizen children's health.

Figure 2-1: Adapted Conceptual Framework

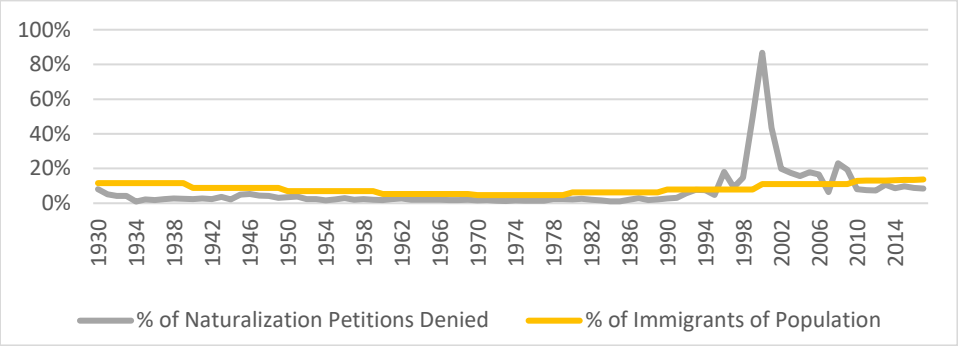


Note: Adapted from the Committee on the Social Determinants of Health Framework in the World Health Organization (2010).

2.3.1: Pathways to U.S. Citizenship for Foreign-Born Individuals

The majority of immigrants in the United States have a permanent or temporary immigration status or are naturalized citizens (Radford & Budiman, 2018). Nevertheless, procedures for legal immigration have become more complicated and costlier for individuals over time (Massey & Pren, 2012). Similarly, data suggest that gaining citizenship through naturalization has become increasingly difficult (Figure 2-2). Although immigrants as a share of total U.S. population increased relatively slowly from 1930 to 2016, denials of naturalization petitions surged in the mid-1990s and have remained higher than in earlier decades.

Figure 2-2: Immigrant Share of Population vs. Naturalization Petition Denials, 1930 – 2016



Source: (United Nations, 2017)

An estimated seven percent of all children in the United States have at least one parent that is an unauthorized immigrant (Capps, Fix, & Zong, 2016). Immigrants without documentation living in the United States cannot pursue citizenship through marriage or family sponsorship without first being deported; depending on how long people were in the country unauthorized, they would be barred from returning to the United States for three to ten years (American Immigration Council, 2016). Waivers to the three-year and ten-year bar exist, but as of 2013 the wait for a waiver was upwards of a year (American Immigration Council, 2016).

Until 2012, undocumented immigrant children were subject to deportation and detention just as undocumented immigrant adults. In 2012, the Secretary of the Department of Homeland Defense issued a memorandum—broadly referred to as Deferred Action for Childhood Arrivals (DACA)—that defers deportation action for two years against an individual that had entered into the United States as a child without authorization, subject to renewals (United States Department of Homeland Security, 2019). Foreign-born children must be at least 15 years old before they can apply for DACA (Immigrant Legal Resource Center, 2018). DACA recipients receive work

permits and are allowed access to federal social programs; DACA recipients are not granted a pathway to citizenship (Immigrant Legal Resource Center, 2016).

2.3.2 Medicaid/CHIP Eligibility Restrictions

The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA)—the farthest-reaching social policy legislation in force today—circumscribes children's coverage by Medicaid/CHIP. Enacted in 1996, PRWORA created "qualifying" and "not qualifying" immigration statuses for Medicaid and CHIP eligibility (Fortuny & Chaundry, 2011). Children that possess a "qualified immigration status" can enroll in Medicaid or CHIP after a period of five years (referred to here as the "five-year ban"). PRWORA established that adults and children who are refugees, asylees, Cuban/Haitian entrants, or who have suffered violence or have been trafficked are exempt from the five-year ban (United States Department of Health and Human Services: Office of the Assistant Secretary, 2009). Importantly, PRWORA states that undocumented immigrants are "not qualified" to receive CHIP or Medicaid federal funding.

PRWORA left states able to require only verbal affidavits that applicants for Medicaid and CHIP were not in deportation proceedings in order to register them for health insurance (Rosenbaum, 2007). However, the Deficit Reduction Act (DRA) enacted in 2006 required new applicants and current enrollees to provide original documents to prove citizenship and identity. The target for the DRA citizenship eligibility documentation requirements were ostensibly undocumented immigrants, but estimates suggest that far more people beyond undocumented immigrants were adversely affected (Rosenbaum, 2007). Even among eligible immigrant populations, low enrollment in

public health insurance has persisted decades after legislation tying eligibility to citizenship was enacted (Kincheloe, Frates, & Brown, 2007; Kandula, Grogan, Rathouz, & Lauderdale, 2004).

Immigrants' income eligibility for public health insurance is complicated by sponsorship requirements for legal permanent residents to immigrate to the United States. Sponsors, such as relatives for family-based immigration, sign an affidavit accepting financial responsibility for the potential legal permanent resident for three to five years. Once in the country, if a legal permanent resident were to apply for Medicaid or CHIP, their income along with portions of their sponsors' income are considered to determine eligibility for the programs (Lynch, 2019). Legal permanent residents might be deemed ineligible for Medicaid/CHIP based on combined income whereas they would have been eligible if eligibility was determined based on their income alone (Siskin, 2016).

A 2008 review of state differences among healthcare use and access found that state policies were significant in determining immigrant access to care, with large disparities between the states (Yu, Huang, & Kogan, 2008). In 2009, Congress enacted the Children's Health Insurance Program Reauthorization Act (CHIPRA); CHIPRA provided federal matching funds to states that opted to waive the five-year ban for children with "qualified" immigration statuses (National Conference of State Legislatures, 2017). An analysis of insurance coverage for immigrant children found significant differences among states that extended Medicaid and CHIP to immigrant children within the five-year ban (Saloner, Koyawala, & Kenney, 2014). Before CHIPRA, 36 states upheld the five-year ban from Medicaid/CHIP for immigrant children (Saloner, Koyawala, & Kenney, 2014). As of 2018, nineteen states had maintained the

five-year ban from Medicaid/CHIP for immigrant children who possess qualified immigration statuses (Brooks, Wagnerman, Artiga, & Cornachione, 2018). As of December 2019, there is an executive decision pending to include Medicaid receipt in the calculations of public charge determination; legal permanent residents can be denied requests to become U.S. citizens if they are deemed to be a potential public charge. Including Medicaid in public charge determinations is likely to lower noncitizen children's applications to participate in Medicaid/CHIP.

Including undocumented children in Medicaid/CHIP remains a particular challenge. At the federal level, DACA recipients between the ages of 15 and 18 are the only immigrant children without documentation who are eligible to be covered by federal Medicaid/CHIP matching funds. As of December 2019, the Supreme Court of the United States is reviewing whether the executive branch can rescind DACA. Some states extend Medicaid/CHIP coverage to children without documentation while others do not. As of 2015, six states had extended Medicaid/CHIP to all children regardless of immigration status, which included being undocumented (Broder, Moussavian, & Blazer, 2015).

2.4 The Healthy Immigrant Paradox

For decades policy researchers have investigated the health status of immigrants residing in the United States as a means to predict immigrants' need for healthcare and their impact on health systems (Antecol & Bedard, 2006; Markides & Rote, 2019; Singh, Rodriguez-Lainz, & Kogan, 2013). These investigations have documented a "healthy immigrant paradox": immigrants, in particular recent arrivals, are healthier than native-born counterparts, but immigrants' health advantages seem to deteriorate the longer they

live in their host countries (National Academies of Sciences, Engineering and Medicine, 2015). Public agencies do not collect routine monitoring data on health outcomes specifically for noncitizen children by race, ethnicity or immigration status (Singh, Rodriguez-Lainz, & Kogan, 2013). Nevertheless, a recent systematic review of the body of evidence of the healthy immigrant paradox found that results vary substantially depending on the immigrant sub-group being examined (Teruya & Bazargan-Hejazi, 2013). For example, one study of Cubans and Puerto Ricans found that the healthy immigrant paradox did not apply to these populations in terms of mortality (Abraido-Lanza, Dohrenwend, & Ng-Mak, 1999). Another study found that immigrants that arrive during childhood to the United States did not have a mortality advantage relative to their native-born peers (Markides & Rote, 2019). Children in the United States with migration backgrounds have a higher risk for childhood obesity (Kobel, et al., 2017). In contrast, foreign-born adolescents living in the United States are less likely to exhibit obesity compared to their adolescent native-born counterparts (Balcazar, Grineski, & Collins, 2015). A different study found that immigrant children's citizenship status was not associated with having a respiratory illness (Balcazar, Grineski, & Collins, 2015). Many studies in the United States suffer from selection bias and confounders in comparing children's differences in health outcomes, but study design limitations do not explain the totality of mixed results. For example, a natural experiment from New Zealand found that the experience of migration was associated with increases of obesity among three- to five-year-olds, but had no physical impact on health of six- to 18-year-olds (Stillman, Gibson, & Mckenzie, 2012).

Differences in legal status and the implications for economic assets, education and mobility among immigrants are well documented in the literature (Torres & Young, 2016; Oxman-Martinez, et al., 2005). Federal healthcare policies integrating noncitizen children with permanent or temporary immigration status into public health insurance programs have been associated with improved health outcomes (Saloner, Koyawala, & Kenney, 2014; Flores, et al., 2017). In the 2003 United States New Immigrant Survey, immigrants with previous undocumented status were the least healthy among immigrants interviewed (National Institutes of Health, 2011). Recent studies have found anti-immigrant policies, particularly those directed toward undocumented immigrants, have increased depression, anxiety and other mental health issues among foreign-born children (Perreira & Pedroza, 2019). Increases in deportations and enforcement among adult immigrants have been associated with lower Medicaid enrollment among noncitizens (Vargas, 2015). Research has demonstrated that prolonged exposure to discrimination explains certain immigrant groups' declines in health relative to native-born peers the longer that they reside in the United States (Abraído-Lanza, Echeverría, & Flórez, 2016).

Immigrant parents' legal status and trajectory also seem to have implications for their foreign-born children living in the United States. Immigrant children's health is heavily dependent upon their parents' or guardians' decisions (García-Pérez, 2013). Immigrant parents' decisions to delay routine or preventative healthcare for their children have been associated with poorer health outcomes for their children (Perreira & Pedroza, 2019). An analysis of immigrant parents' transition from being unauthorized to other immigration statuses found that undocumented immigrant mothers in immigrant families of Mexican origin seemed to take longer to obtain documented immigration status than

undocumented mothers in families from Asian home countries, resulting in different opportunities for their children's education and mobility (Bean, Leach, Brown, Bachmeier, & Hipp, 2011).

2.5 Healthcare Cost Containment in the United States, Lack of Insurance and Delays in Care Due to Cost

Since 2000, at least one-tenth of the United States' population has been foreign-born (Zong, Batalova, & Burrows, 2019). Demonstrating that immigrant populations arrive in good health is of particular importance in the United States, which has struggled for decades to contain rising health care costs. Unlike spending on other industries (e.g. transportation, education) that have grown in tandem with GDP growth, healthcare spending has surpassed GDP growth for decades (Kaiser Family Foundation, 2012).

2.5.1 Approach to Healthcare Cost Containment in the United States

The United States has implemented cost containment through benefit reduction, cost-sharing, co-insurance and deductibles (Stadhoudersa, Krusea, Tanke, Koolman, & Jeurissena, 2019). The United States' cost containment approach to insurance and healthcare access stems from peculiar characteristics of United States' history, politics and policies toward public health and public provision of healthcare. Arguably two pivotal points propelled the United States to this norm. The first was when economist Mark Pauly bested economist Kenneth Arrow in a debate about whether economic theory could be adequately applied to healthcare utilization. The second was the publication of the 1974 RAND Corporation's randomized control trial of health insurance and healthcare use.

Kenneth Arrow, who won the Nobel prize for his "impossibility theorem", exposed that voting cannot satisfy basic tenets of economic freedom and elective representation. In 1963, Arrow published "Uncertainty and the Welfare Economics of Medical Care" in the *Economic Review* to explain why healthcare (i.e. the actual provision of goods and services for health in the United States) cannot be examined using standard welfare economics theory and models. In 1968, Mark Pauly rebutted Arrow's article, arguing that healthcare costs could be abated without government intervention by empowering private insurers to control their pool of insured and by shifting costs of care onto patients to prevent overuse (Pauly, 1968). Arrow later conceded to Pauly that healthcare can be examining using standard welfare economics in a comment published in the journal (Arrow, 1968).

In 1974, the RAND Corporation conducted the first randomized control trial of health insurance, healthcare use and costs in the United States. The RAND Corporation results buttressed Pauly's economic theory; the randomized control trial found increased healthcare use among those where insurance covered all or most of patients' healthcare costs (Manning, et al., 1988). Although the RAND Corporation's report noted that uninsured or poorly insured patients reduced all care use, both preventative and curative, due to cost burdens, the cost reductions from lower insurance subsidies of care were far more publicized. Later studies corroborated the RAND Corporation's results that reducing insured healthcare services is associated with lower healthcare usage and, consequently, reduction in overall expenditures on healthcare (Stadhoudersa, Krusea, Tanke, Koolman, & Jeurissena, 2019).

2.5.2 Employer-Provided Health Insurance

Adults' ability to afford private health insurance determines whether children are covered by private health insurance or not. Today, millions of non-elderly adults in the United States remain uninsured because of the high cost of employer-provided health insurance (Henry J Kaiser Family Foundation, 2018). Growth in health insurance premiums have outpaced wage growth since 1988 (Kaiser Family Foundation, 2012). Financial barriers, language barriers and lack of familiarity with the United States' health insurance system hinder foreign-born workers' access to insurance (Carrasquillo, Carrasquillo, & Shea, 2000; Lebrun, 2012; Pitkin Derose, Bahney, Lurie, & Escarce, 2009).

Despite having relatively similar unemployment rates between foreign-born and native-born populations (U.S. Bureau of Labor Statistics, 2009-2019), immigrants have historically experienced lower rates of employer-provided health insurance relative to native-born populations (Light, 2012). Immigrant workers seem to be less likely to be offered health insurance through their employers than native-born workers. Immigrants are employed in jobs that lack benefits and are concentrated in industries where firms do not offer employer-based insurance (Ku, 2001). After controlling for socioeconomic factors, one study found that differences in employer-provided insurance coverage between immigrant and native-born workers was largely attributable to differences in employer offer of insurance (Buchmueller, Sasso, Lurie, & Dolfin, 2007). The healthcare exchanges in the Affordable Care Act are likely to improve immigrant workers' access to private health insurance, but it remains unclear that they eliminate enough barriers to

participation to substantially improve immigrants' health insurance coverage (Kaiser Family Foundation, 2019).

2.5.3 Financial Barriers to Healthcare and Consequences for Health

The individual burden to pay for healthcare services and cost of health insurance engenders delays in accessing needed health services (Hoffman, 2007). Low healthcare utilization due to cost is a primary force in health disparities in the United States (Powell, 2016). A preponderance of evidence demonstrates that being uninsured and reducing healthcare usage, particularly routine and preventative care, is neither cost-effective nor good for public health (World Health Organization, 2013).

Immigrants are exceptionally susceptible to the damaging effects of lack of insurance and low healthcare use. A systematic review of 1,559 articles on immigrants' healthcare access, quality and cost returned just four articles on cost; the articles reported a lower burden of outlays for public insurance and publicly-funded services among immigrants compared to native-born populations (Derose, Bahney, Lurie, & Escarce, 2009). These lower outlays are likely associated with inadequate healthcare utilization; data suggest that immigrants are forgoing preventative care and routine care for chronic condition management and care for minor injuries, which result in long-term health damage and complex hospital or emergency care needs (Okie, 2007). One University of Colorado study found that lower access to care was to blame for Latinx immigrants' poor health outcomes for chronic conditions relative to their White native-born peers (Evans, 2018).

Immigrant children's low healthcare utilization mirrors patterns found in immigrant adults (Ku & Jewers, 2013). Among children, lack of insurance is linked to

higher mortality. Compared to publicly insured children, uninsured children were over three times more likely to die to from non-accidental trauma, which is the leading cause of early childhood deaths in the United States (Sonderman, Wolf, Madenci, & Beres, 2018). A longitudinal study of insurance and children's health use and outcomes found that delays in seeking care not only negatively impacted children's health outcomes but also increased hospitalization time (Kraft, 2009).

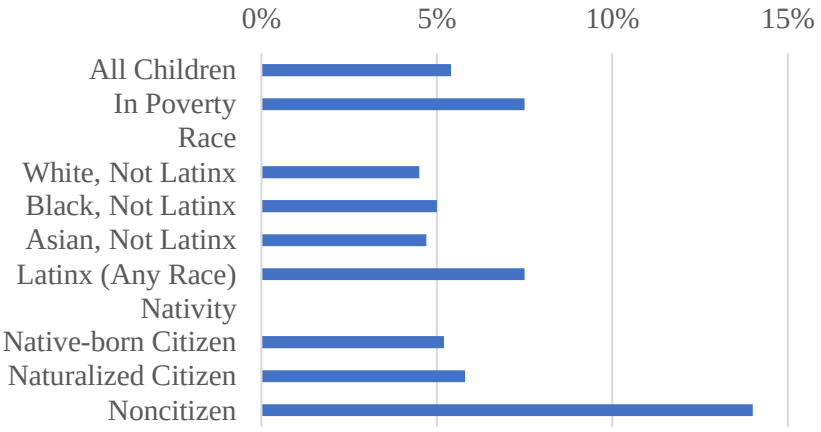
2.6 Noncitizen Children's Lack of Public Health Insurance

A very small share of children in the United States lack health insurance, which experts say is attributable to children's eligibility for public health insurance programs, namely Medicaid and CHIP (Berchick, Hood, & Barnett, 2018). While there have been gains in immigrant children's enrollment in Medicaid/CHIP since 2009, health insurance rates differ depending on children's citizenship (Khullar & Chokshi, 2019; Saloner, Koyawala, & Kenney, 2014).

Being foreign-born and lacking citizenship are negatively associated with children's health insurance coverage. Whereas just five percent of foreign-born naturalized U.S. citizen children lacked health insurance in 2015-2016, 22 percent of noncitizen foreign-born children were uninsured (Radford & Budiman, 2018). Undocumented immigrant children accounted for just three percent of all children in 2010 but represented 13 percent of all uninsured children in the United States (Seiber, 2014). Figure 2-3 shows that noncitizen children as a group have lower insurance coverage compared to groupings of children based on race, ethnicity or poverty. Moreover, citizenship might also be a true driver for inequities seen on the basis of race

and ethnicity. Ku and Matani (2001) found that ethnicity was not a statistically significant indicator of health insurance after controlling for citizenship.

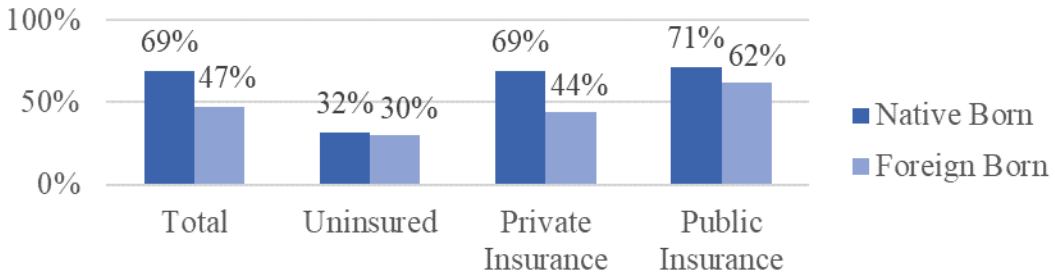
Figure 2-3: Share of Children Without Insurance, 2017



Source: (Berchick, Hood, & Barnett, 2018)

A natural experiment study across three immigrant communities in Hawaii found that state health insurance directed at Marshallese immigrants advantaged their healthcare access over immigrants with higher socioeconomic statuses that were left out of public health insurance programs (Choi, 2009). Figure 2-4 presents comparisons in healthcare utilization between foreign-born and native-born children by different insurance coverage; data suggest that public insurance—as opposed to private health insurance coverage—is better for children's healthcare access (Ku and Jewers, 2013).

Figure 2-4: Share of Low-Income Children (Younger than 17) With Any Office-Based Medical Visit in the Year Prior, 2010



Source: (Ku & Jewers, 2013)

Chapter 3: Methods

The author aims to isolate the impact of lack of U.S. citizenship on health insurance coverage, healthcare utilization and health for an especially vulnerable population in the United States: foreign-born noncitizen children living in mixed-status families. Specifically, three research questions are addressed in this dissertation:

1. Within mixed-status families, does reported health status differ by children's citizenship status?
2. Within mixed-status families, is needed healthcare more frequently delayed due to cost for noncitizen children than for citizen children?
3. Within mixed-status families, are noncitizen children less likely to be publicly insured than citizen children?

Because random assignment of citizenship is neither ethical nor feasible, a quasi-experimental design was employed to answer the author's research questions (Shadish, Cook, & Campbell, 2002). The author utilized observational data collected from the National Health Interview Survey (NHIS) to compare public health insurance coverage, delay in needed healthcare due to cost, and health status between U.S. citizen and noncitizen children living within the same mixed-status family. To make causal inferences, the author chose family level fixed-effects as the identification strategy (Angrist & Pischke, 2009).

3.1 Data Source

This dissertation uses the National Health Interview Survey (NHIS) as its data source. The NHIS was established under the National Health Survey Act of 1957 to survey "…the health of the American people." (The National Health Survey Act, 1957). The NHIS is a continuous nationally representative survey of residents' health and health service utilization (Centers for Disease Control, 2018). NHIS data are used by policy makers to determine the health service needs of the United States (Centers for Disease Control, 2018).

The NHIS is sponsored by National Center for Health Statistics (NCHS) in the Centers for Disease Control (CDC) (National Center for Health Statistics, 2016). The U.S. Census Bureau is contracted to administer the NHIS data collection. Each year, the U.S. Census Bureau hires, trains and oversees approximately 750 interviewers who conduct the NHIS throughout the year (National Center for Health Statistics, 2016). The NHIS is administered through in-person interviews; in a small fraction of cases interviews that were started in-person are completed by phone if follow-up visits were attempted and failed multiple times. Since 1997 the NHIS interviewers have used a computer-aided survey that routes the interviewer to appropriate questions and determines whether entered data are within an acceptable format and range (Division of Health Interview Statistics, 2012).

3.1.1 NHIS Sample Design

The author relies on Parsons et al. (2014) to describe the NCHS sampling strategy unless otherwise noted. The NCHS employs a multistage sampling strategy that includes stratification and clustering (Centers for Disease Control, 2018). The NHIS sample

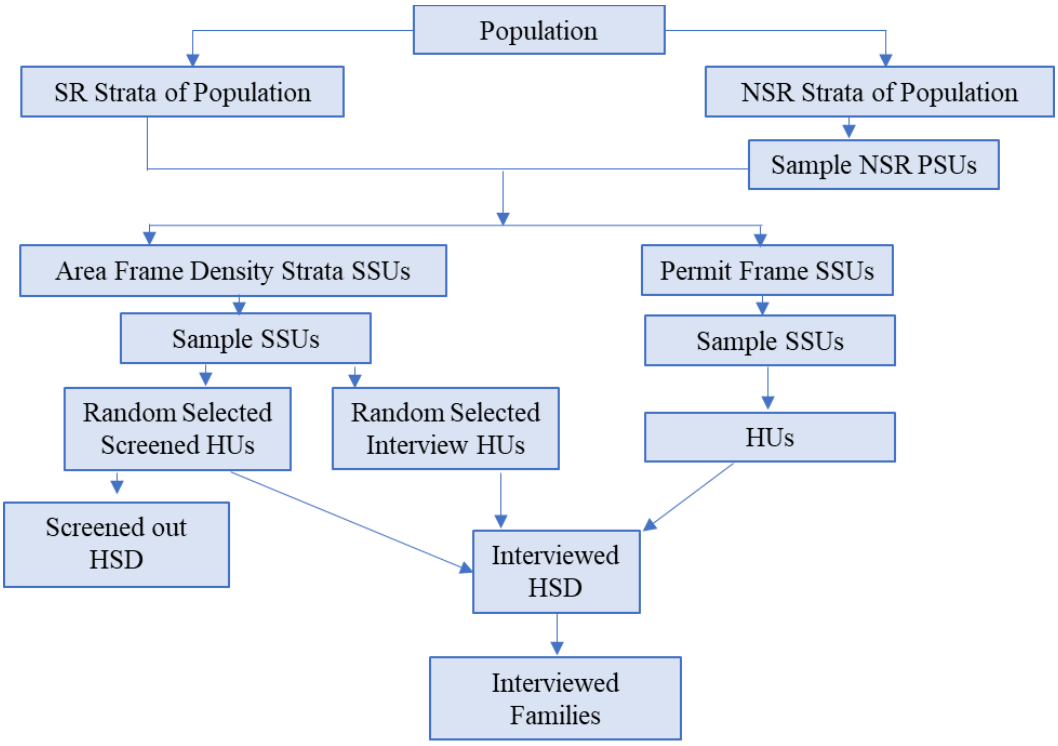
strategy is redesigned after every decennial census; the data included in this dissertation were collected using the 2006-2015 NHIS sampling framework. The 2006-2015 NHIS oversampled households where at least one member reported being Black, Hispanic or Asian; families with these racial characteristics would have a higher probability of being sampled than in an equal probability method (Parsons, et al., 2014). The oversampling of households with members that identified as Black, Hispanic or Asian was helpful in increasing the number of observations for analyses performed in this dissertation. The sample size was augmented in 32 states and in the District of Columbia from 2011 to 2015, which also increased the potential observations that could be included in analyses here (Division of Health Interview Statistics, 2012).

The 2006-2015 NHIS sample was created using an area-based frame supplemented by building permit information (Figure 3-1). The United States was divided into primary sampling units (PSUs) that are either counties or groups of adjacent counties within each state. PSUs with large populations were considered self-representing (SR) strata and sampled. PSUs with smaller populations (i.e. not self-representing or NSR) were grouped together, and a sample was selected from the group. Within PSUs, blocks were combined based on the total number of housing units (HUs) in each block per the 2000 U.S. Census to form secondary sampling units (SSUs). Each year, housing units (HUs) were sampled from each area-based SSU. An additional sample of HUs was created using the building permit data from SSUs that issued building permits.

All families within interviewed households (HSDs) were asked to be interviewed. Households in sample HUs from area-based SSUs were randomly selected from their respective area-based SSUs either to be interviewed or screened depending on the

probability of having a member from a racial or ethnic minority. Screened households were selected to interview only if at least one member reported being Black, Hispanic or Asian. All households from the HU sample constructed using building permits were interviewed.

Figure 3-1: NHIS Sample Design



Notes: HU – housing unit; HSD – household; NSR – nonself-representing (i.e. smaller populations); PSU – Primary Sampling Unit; SR – Self-representing (i.e. large populations such as New York City); SSU – secondary sampling unit.
Source: (Parsons, et al., 2014)

3.1.2 Families in NHIS

A family in the NHIS consists of two or more people who are related to each other and live in the same household (Parsons, et al., 2014). For example, within one household, a reference person's spouse, daughter, foster daughter, sister, niece, and daughter-in-law would be counted as being in one family. Within the NHIS definition of

family, multiple related adults with their respective biological and adopted children would be considered as part of one family. Additionally, adopted and biological children of spouses or partners living in the same household are part of the same family. As mentioned earlier, all families within a household were asked to be interviewed; family response rates were within one percentage point of the household response rates across all the years. The family response rates ranged from 84.5 percent to 69.3 percent of eligible families for 2008 and 2015, respectively (Table 3-1) (National Center for Health Statistics, 2016).

Table 3-1: Family Response Rates and Sample Size Per Year, 2008-2015

Sample Year	Household Response Rate	Family Response Rate Among Responding Households	Total Number of Eligible Families	Number of Families Completed Interviews	Final Family Response Rate
2008	84.9	99.5	29,569	29,421	84.5
2009	82.2	99.3	34,899	34,640	81.6
2010	79.5	99.1	35,509	35,177	78.7
2011	82.0	99.2	40,829	40,496	81.3
2012	77.6	99.0	43,785	43,345	76.8
2013	75.7	99.0	42,766	42,321	74.9
2014	73.8	99.0	46,068	45,597	73.1
2015	70.1	98.9	42,762	42,288	69.3

Source: (Centers for Disease Control, 2016)

3.1.3 NHIS Non-Response

The NCHS made adjustments for non-response based on geography and race/ethnicity for both interviewed and screened households (Parsons, et al., 2014). The author relies on the NCHS' adjustments to data and is reasonably confident that non-response to NHIS did not bias estimates produced as part of this dissertation. Although response rates for the NHIS have declined throughout the 2000s, (Moriarity & Dahlhamer, 2012), the NHIS does not have issues of non-response analogous to surveys

administered online, by mail or through the telephone that might bias estimates (U.S. Census Bureau, 2017). Additionally, a review of reasons for non-response collected over time from interviewers do not exhibit clear patterns of reasons for non-response (The National Academies Press, 2013).

3.2 Independent and Dependent Variables

Data used for analyses come from questions that were asked of all members of the family and are suitable for analysis across years (Division of Health Interview Statistics, 2012). This dissertation relies on data from the NHIS Family Core questions on health status, health care access, health insurance, and socio-demographic characteristics (Division of Health Interview Statistics , 2016). NHIS data that correspond to children aged sixteen and younger are collected using proxy reporting: an NHIS interviewer will interview one "responsible adult family member" and record their answers for family members aged sixteen and younger living in the same household (Parsons, et al., 2014). Data for children aged seventeen are directly reported if the 17-year-old is present during the time of the interview; if the 17-year-old is absent during the interview the data are collected via proxy reporting (Parsons, et al., 2014).

Data were downloaded from Integrated Public Use Microdata Series (IPUMS); IPUMS harmonizes the variable names and coding across surveys to facilitate analysis of variables for data pooled across years (IPUMS, 2018). Table 3-2 provides the response rates for NHIS questions used for analyses. The variables gender and year do not have missing or unknown data. All other questions had 98 percent or higher completion rates

(i.e. less than one percent of all observations had data that were either missing, unknown, or refused to answer).

3.2.1 Selection of Independent Variables for Analyses

The author organized her results according to her three research questions. Table 3-2 provides response rates per variable by year used in the analysis. For each research question the author first made comparisons between citizen and noncitizen children and, among noncitizen children, between noncitizen children living in mixed-status families (i.e. those that had at least one child with U.S. citizenship and at least one child without U.S. citizenship) and noncitizen children living in uniform noncitizen families (i.e. where all members lack U.S. citizenship). She then conducted predictive analyses for all mixed-status families. In addition, she analyzed certain subgroups: for health status she analyzed just poor mixed-status families; for public health insurance she analyzed all mixed-status families residing in the South and West regions. The main variable of interest for all the predictive analyses was noncitizenship.

Table 3-2: Response Rates, per Variable, by Survey Year

Variable	2008	2009	2010	2011	2012	2013	2014	2015
Age	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Citizenship Status	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
Delay Care Due to Cost	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.8
Gender	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Health Status	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.8

Source: IPUMS (2019) code sections in case-count view for each NHIS variable.

3.2.1.1 Noncitizenship as the independent variable of interest

The author's primary interest is how lack of citizenship influences health status, delays in care due to cost and health insurance coverage. Therefore, the citizenship

variable was coded as “noncitizenship” with “1” being noncitizen (i.e. lacking citizenship) and with “0” possessing U.S. citizenship. The survey question used to measure citizenship is: “Are you [is the reference person] a citizen of the United States?” IPUMS coded as “Yes, Citizen” the options in NHIS that are: Yes, born in one of the 50 United States or the District of Columbia; Yes, born in Puerto Rico, Guam, American Virgin Islands, or other U.S. territory; Yes, born abroad to American parent(s); Yes, U.S. citizen by naturalization. Therefore, citizenship in these analyses includes U.S. citizenship by naturalization or by birth. Noncitizen is a singular category. The NHIS does not collect additional information on individual’s immigration status.

3.2.2 Examining the Healthy Immigrant Paradox

For the first research question, the author examined the extent to which the healthy immigrant paradox was found in analyses of health status and physical limitation. After providing an overview of health status, binary health status and physical limitations, the author then examined poverty, gender, race and ethnicity and age in relation to health status by children’s citizenship and then, among noncitizen children, by whether they lived in a mixed-status family or a uniform noncitizen status family.

Health Status: The health status variable is based on a Likert scale of “excellent”, “very good”, “good”, “fair”, and “poor” in response to the question: “Would you say that [reference person's] health in general is excellent, very good, good, fair, or poor?” (IPUMS, 2019). Health status is proxy reported for children ages 0 to 16 and either proxy reported or self-reported for children aged seventeen.

Binary Health: For the binary health variable, the author coded health status as a binary variable with “good”, “fair”, and “poor” being zero and “very good” and “excellent” being one.

Physical Limitation: Physical limitation is a variable coded as 1 “limited in any way” and 0 if there is either no limitation or limitation is unknown. The Physical Limitation variable is a composite of several questions asked for different age groups, the most relevant questions for children are (IPUMS, 2019):

- For persons under age five, “Is [reference person] limited in the kind or amount of play activities [he/she] can do because of a physical, mental, or emotional problem?”
- For persons age five and older, “Because of a physical, mental, or emotional problem, does [reference person] need the help of other persons in handling routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?”
- For persons under age 18, "Does [reference person] receive Special Educational or Early Intervention Services?"
- For all persons, “Is [reference person] limited in any way in any activities because of physical, mental or emotional problems?”

Poverty: Poverty is a binary variable that refers to “at or above the threshold” and “below the threshold”. Respondents were shown a card with income categories and asked to select one category that was closest to the total family income before taxes from the previous calendar year from all sources. Total family income, taking into account family

size and number of children/dependents, was then compared to the U.S. Census Bureau's poverty threshold for that year. Poverty of the entire family is assigned to each member.

Female: Female here is measured by the variable "sex" in the NHIS data. Interviewers record an individual as male or female based on their first name and relationship to the respondent. In cases where the interviewer is unsure, the respondent is asked to confirm the choice of male or female. The female variable used here is called "Female"; the author coded female as "1" and male as "0".

Ethnicity and Race: Race and ethnicity were taken from separate questions in the NHIS survey. Ethnicity is a dichotomous variable that indicates whether a person reports either: "No, not of Hispanic ethnicity" or "Yes, of Hispanic Ethnicity". Race is defined as the primary, self-reported race of each person in a family. The respondent was asked "What race or races [fill1: Do you/Does ALIAS] consider [fill2: yourself/himself/herself] to be?" Each person could then select one or more of the following: White; Black/African American; Indian (American); Alaska Native; Native Hawaiian; Guamanian; Samoan; Other Pacific Islander; Asian Indian; Chinese; Filipino; Japanese; Korean; Vietnamese; Other Asian. These categories were eventually combined to be one of the following: White; Black/African American; Asian; American Indian/Alaskan Native; Multiple Race. For all years included here, NHIS used a "hot-deck imputation" of race and ethnicity to improve data quality if the answer was uncertain or the respondent refused to provide their race or ethnicity (Centers for Disease Control and Prevention, 2015).

Age: Age is a two-digit numeric value and is reported as years since an individual's last birthday. Because age is considered integral to instrument quality and

checks NHIS interviewers never leave data on age as "unknown" (IPUMS, 2019); missing entries of age are coded as 99.

Age Groups: Using the variable age, the author created three age groups to compare the distribution of ages by citizenship and, among noncitizen children, by whether they lived in a mixed-status or uniform noncitizen status family. The age groups were defined as "0" ages zero to five years of age; "1" ages six to eleven; "2" ages twelve to seventeen.

Years in the United States: Years in the United States was calculated from the calendar year provided in response to: "In what year did you come to the United States to stay?" to the current survey year, or the self-reported answer to the follow-up question "About how long have you been in the United States?". Responses of years in the United States were collected for all persons who were not born in the 50 states or the District of Columbia. The author combined this answer with data on whether a child was foreign born to ensure that only noncitizen children born outside of all the states and territories were included in analyses.

3.2.3 Examining Delay of Needed Care Due to Cost

Type of Health Insurance Coverage: The author created health insurance type using the following variables: health insurance coverage, public health insurance coverage and private health insurance coverage. Public health insurance coverage came from the variable HIPUBCOVE, which IPUMS constructed using: HIMCAIDE, HISTATEE, HICHIPE, and HIOTHGOVE. HIPUBCOV excludes military coverage (HIMILITE), Medicare (HIMCAREE), and Indian Health Service coverage (HIHSE). Coverage is being covered at the time of the survey.

Uninsured: Uninsured was used as a dependent variable in the estimator to supplement the models on health status and delay of needed healthcare due to cost. Uninsured means lacking any type of public or private health insurance that pays for healthcare services at the time of the survey.

Delay in Needed Healthcare Due to Cost: Delay in needed healthcare due to cost is the measurement used in this dissertation to analyze healthcare utilization. It is the dependent variable in the second research question and an independent variable in estimators for the health status questions. Interviewers asked: "During the past 12 months, [fill: have you delayed seeking medical care/has medical care been delayed for anyone in the family] because of worry about the cost?" If the answer was affirmative, the interviewer coded all members of the family for whom care had been delayed due to worry about the cost.

3.2.4 Examining Public Health Insurance

Public Health Insurance Coverage: Public health insurance coverage was the dependent variable in the estimator that answers the third research question. Public health insurance refers to Medicaid, CHIP, or any other state or local program that pays for healthcare services; coverage means being insured at the time of the survey (IPUMS, 2019). Public health insurance coverage is collected via two-step question: the first question is "Are you covered by health insurance or some other kind of health care plan?"; if the first question is positive, then the interviewer asks "What kind of health insurance or health care coverage do you have?" and the respondent can choose more than one type of insurance.

Region: Region refers to the geographic location where survey participants resided at the time of answering the survey. Region was based on survey processing and not asked of respondents. NHIS includes four regions recognized by the U.S. Census Bureau. The four regions are:

1. Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.
2. North Central/Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
3. South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.
4. West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

3.3 Identification Strategy

This dissertation employs a within-family (also referred to as "family-based") design; specifically, the author uses family level fixed-effects to control for unobservable confounding factors associated with the family in the estimators. Within-family designs have been employed in psychology and epidemiological studies for decades (Gauderman, Witte, & Thomas, 1999; Schnell, 2008). Children within the same family are expected to have many shared experiences, which are controlled for in the estimation by controlling for family unobserved and observed characteristics; at the same time, the within-family design assumes that children in the same family have experiences that are not shared

(Plomin, 2011). Analyses conducted as part of this dissertation extract the impacts on health insurance, healthcare delay due to cost, and health status based on the nonshared experience of citizenship among children within the same family.

Constructing the Family Identifier Variable for Family Level Fixed-Effects: The author merged two IPUMS constructed variables and year to create a unique identifier for each family. The household identification is a six-digit number that is unique to each household in a given survey year. A family living within each household are assigned a two-digit number (00 to 99). Combining the household identification number with the family number and the year of the survey creates a unique family identification number for each family in the dataset. The 12-digit family identification variable (i.e. 6-digit household id plus 2-digit family number plus 4-digit year) is included in all the estimators as fixed-effects.

3.3.1 Descriptive and Predictive Statistics

The author used STATA statistical software edition IC15.1 to conduct analyses. All the commands for STATA use svy: subpop. The author conducted descriptive statistics that included proportions, means, and linear combination tests of statistical difference of means. These linear combination tests of statistical difference of means were all two-tailed tests of significance. Family level fixed-effects used for predictive analyses absorb unobservable and observable factors that influence health insurance coverage, delay in care, and health status.

Predictive analyses relied on a conditional logistic estimator with fixed-effects. Leighton Ku provided the theoretical formula for the construction of the conditional logistic models and the estimators (Below). The author used the syntax subpop limiting

the analytical sample to children (ages 0 to 17) in mixed-status families. The author conducted all the predictive analyses using the syntax clogit in order to use grouped by family id. Results were reported in terms of marginal effects, with "i" put in front of each categorical/binary variable and age held at its mean. The author used binary conditional logit estimators for health insurance coverage, excellent/very good health and delay of care due to cost. Below is an example of the conditional logit model to examine the impacts of noncitizenship (Yes/1 or No/0) on the binary outcome variables: health insurance, excellent/very good health compared to good/fair and poor health, and delayed care due to cost. Here, let i = 1, …, M index all families in the sub-population, and j = 1, …, N_i index all children in the sub-population within a given family. Let Y_{ij} be the binary dependent variable for access and insurance. The model that accounts for the confounding factors of family is:

$$Ln(p_{ij}/(1-p_{ij}) = \beta_0 + \beta_c C_{ij} + \beta_x X_{ij} + b_j F_j$$

Where:

p_{ij} is the probability of an outcome (being insured, having Medicaid, delay in health care, very good/excellent health) vs 1-p, such as being uninsured, not having Medicaid, not having a delay in health care or good/fair/poor health;

j = the family;

i = the child i within a family j;

C_{ij} = whether this child is a noncitizen relative to his/her citizen kin within their family;

X_{ij} = a vector of other characteristics for each child, such as age, gender, or physical limitations;

β_0= the estimated coefficients (or constant) and;

$b_j F_j$ = the family level fixed-effects.

Thus, after netting out the fixed-effects, the focus of attention is on the variation in children's citizenship status and other individual characteristics of each child within one family, holding constant all other characteristics of the family, such as poverty, race/ethnicity, resource endowments, idiosyncratic beliefs or cultural perspectives, parentage, and year that the family appeared in the survey that might otherwise affect the outcomes.

3.3.2 Model Specification

The literature review and conceptual framework provides the author's reasoning and evidence for using the within-family identification strategy to isolate the impact of noncitizenship on children's health, healthcare utilization and insurance coverage within mixed-status families. The author attempted to minimize specification error by including, family level fixed-effects and individual covariates such as age and gender in all the models for the research questions. In addition, health insurance coverage, delay of care due to cost, and health status are also included as independent variables when appropriate; for example, when delay of care due to cost is the dependent variable, health status and uninsured are included as controls.

3.3.3 Standard Errors and Variance

Survey weights and clustering in the NHIS sampling design were accounted for in order to generate accurate point estimates, variance and standard errors in the analyses. The estimators used here integrate two variables to account for the impact of the NHIS sample design clustering on variance and standard errors: PSU and STRATA. Because

this dissertation relied on data from 2008 to 2015, which were collected using the same sampling design, the PSU and STRATA variables are consistent across the years analyzed (IPUMS, 2018). The author uses the IPUMS' variable that "…harmonizes the Final Annual Weight in the original NHIS public use files" (IPUMS, 2018). Because data are pooled across eight years, the author followed the IPUMS' guidance of adjusting the family weight by eight years (IPUMS, 2018). IPUMS notes that the simple calculation of dividing by the number of years pooled performs as well as other sophisticated techniques. For this reason, the author chose the most straightforward calculation.

3.3.4 Sample for Analysis

The author conducted a power analysis using the statistical software PowerUp! tool (Dong & Maynard, 2013) to determine the appropriate sample size for analysis. The blocked cluster fixed effect design was chosen to calculate the power analysis with the idea that families are blocks and children within each family experience either "treatment" (noncitizenship) or "control" (citizenship). Figure 3-2 shows the assumptions and comments for the power analysis. The aim was to detect at least a modest minimum detectable effect size (MDES) of .20; for insurance coverage, delay in healthcare due to cost and health status the median outcome for noncitizen children was expected to be different from citizen children's outcomes at the 58^{th} percentile (Gurgand & Rathelot, 2012).

To detect this MDES, the sample should contain at least 328 families according to the PowerUp! software. With this sample size and an R^2 of at least .2 the author is 95 percent confident that the estimators will not falsely detect a difference between noncitizen and citizen children when no true difference existed, and has a 5 percent

possibility of failing to reject the null of no difference between citizen and noncitizen children, when in fact a true difference existed between them.

Figure 3-2: Assumptions for Power Analysis, PowerUp! Software

Model 2.2: Sample Size Calculator for 2-Level Fixed Effects Blocked Individual Random Assignment Designs (BIRA2_1f)—School Intercepts and Interactions with TREATMENT		
Assumptions		Comments
MRES = MDES	0.20	Minimum Relevant Effect Size = Minimum Detectable Effect Size
Alpha Level (α)	0.05	Probability of a Type I error
Two-tailed or One-tailed Test?	2	
Power (1-β)	0.95	Statistical power (1-probability of a Type II error)
P	0.44	Proportion of Level 1 units randomized to treatment: $n_T / (n_T + n_C)$
R_1^2	0.20	Proportion of variance in Level 1 outcome explained by Block and Level 1 covariates
g*	5	Number of Level 1 covariates
n (Average Block Size)	3	Mean number of Level 1 units per Level 2 cluster (harmonic mean recommended)
M (Multiplier)	3.61	Automatically computed
J (Sample Size [# of Blocks])	**328**	The number of blocks needed for the given MDES.

Source: PowerUp! (Dong & Maynard, 2013)

The author examined the efficiency of the NHIS sample compared to a simple random sample for citizenship, excellent/very good health status, public health insurance coverage, and delay in care due to cost. For all the variables, the sample design is less efficient than a simple random sample. For the variables of interest, the sample variance is seven to ten times larger than it would be if the NHIS survey had been conducted using a simple random sample. Because the design effects for the NHIS are large, the author pooled data to get a sample size that was about seven times the size of the sample size suggested by the power analysis. The author pooled NHIS data across eight years: 2008 to 2015, inclusive. The total sample size was 2,446 families. The number of mixed-status families ranged from 249 in 2008 to 363 in 2011.

In order to employ the family fixed-effects identification strategy to detect causal inference, the author created a sample of families with at least two children where at least

one child was not a citizen and at least one child was a citizen of the United States. The sample was created by taking the following steps:

- Variables for age and citizenship were generated for each person record;
- Data were collapsed by a unique family ID, created by merging household id, family number and year;
- A family was flagged as a "mixed child citizenship family" if there was at least one citizen and one noncitizen child within the family;
- The flagged dataset collapsed by family was merged back into the dataset based on person-level data.

3.3.4.1 Characteristics of Sample

The integrity of predictive analyses depended on the sample distributions and characteristics. The author describes the sample in terms of age of children, combinations of citizen and noncitizen children within mixed-status families, and completeness of the survey data used in predictive analyses.

Response rates for each question for noncitizen and citizen children within the mixed-status families were similar. Overall response rates reflected per question response rates for the total NHIS sample. Table 3-3 provides the response rates for children in mixed-status families for the three survey questions that correspond to the three research questions in the analyses. The response rate for all three survey questions were higher than 99 percent, without any clear difference in non-response between citizen and noncitizen children. The response rates among children in mixed-status families for age and gender were 100 percent.

Table 3-3: Children Response Rates for Dependent and Independent Variables

	Non-Response (N)	Non-Response Rate (%)	Non-Citizen Missing (N)	Citizen Missing (N)
Dependent Variables				
Insurance Coverage	33	0.5	19	14
Delayed Care Due to Cost	10	0.1	4	6
Health Status	0	0.0	0	0
Independent Variables				
Age	0	0.0	0	0
Citizenship	0	0.0	0	0
Female	0	0.0	0	0
Physical Limitation	4	> .01	1	> .01

Source: Author's elaboration.

3.3.5 Description of Mixed-Status Family Sample

The sample used for analyses included 2,446 families that included at least one noncitizen child and one citizen child. The families were fairly evenly distributed across the eight years in the sample (Table 3-4).

Table 3-4: Mixed-Status Families in Sample, by Year

Year	Number	Percent of Sample
2008	249	10.2
2009	283	11.6
2010	361	14.8
2011	363	14.8
2012	341	13.9
2013	288	11.8
2014	310	12.7
2015	251	10.3

Note: Mixed-Status Families, N = 2,446

Over two-thirds of the families (75.4%) had either two or three children. No families in the sample had more than 10 children, with just 8.4 percent having five to ten children (Table 3-5).

Table 3-5: Mixed-Status Families, by Number of Children

Number of Children	Number of Families	Share of Families
Two	975	39.9
Three	867	35.5
Four	399	16.3
Five to Ten	205	8.4
Total Families	**2,446**	**100.0**

Note: Mixed-Status Families, N = 2,446

Nearly half of the families (45%, n = 1,102) had the same number of children with and without U.S. citizenship. Among the remaining families (n = 1,344) that do not have equal numbers of noncitizen and citizen children, seven out of ten had fewer noncitizen than citizen children. The author examined age variation in the sample between children with and without citizenship, grouped by age: one group included children aged zero to five; the other group included children aged six to seventeen. As seen in Table 3-6, mixed-status families that had just two children (n = 975) were roughly evenly split between noncitizen and citizen children within the same age group (50.1%, n = 488) and noncitizen and citizen children from differing age groups (50.0%, n = 487). Nearly sixty-nine percent (68.9%, n=1,014) of mixed-status families with three or more children had noncitizen and citizen children within the same age category (i.e. 0 to 5 years and 6 to 17 years, inclusive).

Table 3-6: Mixed-Status Families, by Age Category Dyads, by Number of Children

	Mixed-Status Families, N = 2,446			
	2 Children		**3 or More Children**	
Uniform Age Groups	488	50.1	1,014	68.9
Differing Age Groups	487	50.0	457	31.1
Total	975	100.0	1,471	100.0

In a small number (n = 172) of mixed-status families, at least one noncitizen child was younger than a citizen child. Because of citizenship by birth it is unusual that a noncitizen child would be younger than a citizen child within one family. However, the definition of family in the NHIS is broad, meaning that multiple related adults with their respective biological and adopted children would be considered as part of one family. Additionally, adopted and biological children of spouses or partners living in the same household are part of the same family. Within these contexts, foreign-born children might be younger and brought into the family after other children born in the United States.

3.4 Interpretation and Validity Issues

3.4.1 Issues of Coefficient Interpretation

Family Level Fixed-effects: The estimators controlled for social, economic and family factors and isolate the effect of noncitizenship on differences in health, health insurance and access to care. The fixed-effect variable in the estimators are not consistently estimated because the number of parameters grows with the sample size, but other independent variables produced by the estimators remain consistent (Angrist & Pischke, 2009). The author reports all the coefficient estimates as "absorbing" the observable and unobservable time-consistent family characteristics that differ across families.

Age: From 2008 to 2015, states had different income eligibility requirements for both Medicaid and CHIP that differed at the age of six. The eligibility differences by age became more muted in the years following the Affordable Care Act (2010), but persisted through 2015. Because of variation in income eligibility by age, the variable for age in

the estimator arguable represented differences in income eligibility by age and state as well as the direct relationship between a child's age and reported insurance coverage, health status and delay in care due to cost. Because the policy-relevant variable of interest in this analysis is noncitizenship, the author was not concerned with the blurred interpretation of age on insurance coverage, delay in healthcare due to cost and health status.

3.4.2 Internal Validity of Identification Strategy

The fixed-effects model eliminates considerable exogenous variation. Consequently, estimates in fixed-effects models are heavily influenced by measurement error, omitted variable bias, and confounding due to unobservable characteristics that differ between members of the family and that influence the outcomes of interest.

Year-to-Year Dependency: The NHIS is not a panel dataset. However, because it is a nationally representative sample it is possible for the same family to be in a dataset more than once when data are pooled across years. The author had no way of identifying families that might have been in the survey multiple years, but did not consider repeat family respondents as a source of bias for the estimates.

Measurement Error Due to Misrepresentation: Respondents might want to provide more positive assessments of noncitizen children's health. While mixed-status families might provide higher estimations of their children's health to be socially desirable there is no evidence that parents/caregivers will evaluate children's health differently depending on each child's citizenship status for social desirability. One study of translations for self-rated health status suggests that the translation of "excellent", "very good", "good", "fair" and "poor" into surveys conducted in Spanish produces

biased estimates due to the differences in meaning between "fair" in English and "regular" in Spanish (Viruell-Fuentes, Morenoff, Williams, & House, 2011). Because our predictive analyses control for within family differences, this bias would not exist in our regression analysis. The author noted this limitation in her discussion of the descriptive differences in self-rated health that do not control for language of survey.

Measurement Error Due to Multiple Judgement Calls: A general health question might be interpreted differently by respondents, with some thinking it might only refer to physical ailments and others including behavioral, mental and physical health in their answer to the question. Within one family, the NHIS respondent might be a grandparent or relative that spends more time with one child as opposed to another even though they live in the same family. The author assumes that the respondent assesses the health of all the children equally, meaning that the respondent has the same familiarity and knowledge of all the children in the family.

Omitted Variable Bias: To the extent that differences between children in terms of insurance, access and outcomes are small, small amounts of endogeneity unaccounted for in the model could introduce considerable bias to the estimates (Angrist & Pischke, 2009). For example, studies of differences in twins' schooling and wage outcomes found that within family designs can suffer from omitted variable bias (Bound & Solon, 1999). Unlike schooling and wages, which are jointly related to an individual's ability and motivation that are unobservable and can differ between twins; health insurance and healthcare delay decisions for children due to cost are most likely made by the parents and dependent upon observable factors, such as insurance eligibility, perceived health status, age of child, and gender.

Confounding Due to Birth Order: Although the analyses can control for age, it will almost always be the case that noncitizen children are older than US born citizen children. Because of this, some of the effects associated with noncitizenship may be artifacts of the fact that noncitizen children are more likely to be first- or second-born children, as compared to citizen children who will tend to be second- or third-born children. It is conceivable that some differences related to citizenship status may be related to changes in family dynamics related to birth order, such as parental experience. The author did not find consistent evidence in the research that birth order influences how an adult would report a child's health status, insurance coverage or delay in care due to cost.

3.4.3 External Validity

Generalizability: Because the selected subpopulation includes families with multiple children, the results cannot be generalized to families with only noncitizen children or unaccompanied immigrant minors. Also, because the study sample chosen requires that families have been in the United States for some period in order for a US-born child to be in the family, results are probably not generalizable to the impacts of citizenship status on health for very recent arrivals.

Intervening Events that Influence Health Status: Because the author pooled data across eight years, it is possible that intervening events, such as the Affordable Care Act, could have changed how citizenship might affect health status between 2008 and 2015.

Inappropriate Operationalization of Dependent Variables: For health status, research suggests that parental health assessment of children is aligned with physicians' perspectives and health diagnoses in children (Turney, 2013). Healthcare utilization is

only assessed in terms of delay in care due to worry about cost. Cost is not the only barrier to care, but it is a critical barrier. Focusing on cost is not necessarily a limitation of the analyses, but it is a delimitation of the dissertation; the discussion section makes clear that delay of care is only related to cost concerns.

Inter-Temporal Changes: Aside from immigration—because immigration is captured within citizenship status—it is impossible to control for any temporal changes in the family (e.g., parents got married or divorced during that time or lost a job or had a health shock) that happened between the birth of a foreign-born child and a U.S.-born child.

Chapter 4: Results

4.1 Does Reported Excellent or Very Good Health Differ by Children's Citizenship Status?

4.1.1 Health Status and Physical Limitations

Roughly eight of every ten (83.4%) children in the United States during 2008 and 2015 were in either excellent or very good health. Dividing all children by their citizenship status, the composition of children's health status differed slightly between citizens and noncitizens (Table 4-1). A smaller share (50.4%) of noncitizen children were in excellent health than citizen children (57.5%). A statistically significantly smaller share of noncitizen children had very good or excellent health relative to citizen children ($p < .001$). Less than one-half of one percent (.2%) of citizen children reported being in poor health; a slightly larger share, .3 percent, of noncitizen children reported being in poor health.

Table 4-1: Health Status, Citizen Children vs. Noncitizen Children, 2008 – 2015

Health Status	Children	
	Citizen Children	Noncitizen Children
	%	%
Excellent	57.5	50.4
Very Good	26.1	26.8
Good	14.6	20.5
Fair	1.6	2.1
Poor	0.2	0.3

Disaggregating noncitizen children by whether they lived in a mixed-status family (defined in this dissertation as families where at least one child was not a citizen and at least one child was a U.S. citizen) or uniform noncitizen status family (defined here as

families where all of the members lacked U.S. citizenship) revealed differences between the two groups (Table 4-2). Whereas less than half (47.8%) of noncitizen children in mixed-status families were in excellent health, more than half (52.4%) of noncitizen children in uniform noncitizen families were in excellent health. Among noncitizen children, a statistically significantly smaller share of those in mixed-status families reported being in excellent or very good health compared to their counterparts in uniform noncitizen families ($p < .001$). The same share of noncitizen children in mixed-status and uniform noncitizen families were in poor health.

Table 4-2: Health Status, Noncitizen Children Living in Mixed-Status vs. Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015

Health Status	Noncitizen Children	
	Living in Mixed-Status Families	Living in Uniform Noncitizen Status Families
	%	%
Excellent	47.8	52.4
Very Good	24.8	28.4
Good	25.0	16.9
Fair	2.1	2.0
Poor	0.3	0.3

A little over eight percent (8.3%) of all children living in the United States between 2008 and 2015 had a physical limitation. After grouping children by citizenship, the prevalence of having a physical limitation was statistically significantly different between citizen and noncitizen children ($p < .001$). There was a smaller share of noncitizen children (3.2%) with a physical limitation compared to citizen children (8.5%). There were no statistically significant differences in reported physical limitation between noncitizen children living in mixed-status families versus noncitizen children

living in uniform noncitizen families. Among noncitizen children, the share with a physical limitation was nearly identical across family types; 3.1 percent in mixed-status families versus 3.2 percent in uniform noncitizen status families.

4.1.2 Socioeconomic Factors Associated with the "Healthy Immigrant Paradox": Poverty, Gender, Race, Ethnicity & Age

From 2008 to 2015, 21.4 percent of all children living in the United States were poor. However, the share of children living in poverty differed dramatically between noncitizens (40.5%) and citizens (20.9%) and was statistically significant ($p < .001$). Among noncitizen children, those living in mixed-status families had a higher share living in poverty relative to noncitizen children living in uniform noncitizen families (48.9% vs. 33.8%). Noncitizen children in mixed-status families were statistically significantly more likely to be poor than noncitizen children in uniform noncitizen status families ($p < .001$).

The distribution of reported health status did not differ significantly by citizenship among poor children (Table 4-3). A little under half of poor citizen and poor noncitizen children reported being in excellent health. Similar shares of poor noncitizen children and poor citizen children were in either very good or good health during 2008 and 2015. Looking only at poor children, there was no statistically significant difference in the share of noncitizen children who had very good or excellent health relative to citizen children.

Table 4-3: Health Status, Poor Citizen Children vs. Poor Noncitizen Children, 2008 – 2015

Health Status	Poor Children	
	Citizen Children	Noncitizen Children
	%	%
Excellent	45.9	44.8
Very Good	25.8	27.0
Good	24.3	24.7
Fair	3.5	3.1
Poor	0.5	0.4

Among poor noncitizen children, the distribution of health status differed by whether the noncitizen children lived in mixed-status or uniform noncitizen status families (Table 4-4). Among noncitizen children living below the federal poverty line, a statistically significantly smaller share of those in mixed-status families reported being in excellent or very good health compared to their counterparts in uniform noncitizen status families ($p < .05$).

Table 4-4: Health Status, Poor Noncitizen Children Living in Mixed-Status Families vs. Poor Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015

Health Status	Poor Noncitizen Children	
	Living in Mixed-Status Families	Living in Uniform Noncitizen Status Families
	%	%
Excellent	44.4	45.4
Very Good	24.6	29.7
Good	28.1	20.7
Fair	2.5	3.8
Poor	0.4	0.5

There were no statistical differences in the share of female children versus male children across citizenship. A little under half of noncitizen and citizen children were

female (48.2% vs. 48.9%). Among noncitizen children, 49.5 percent in mixed-status families were female and 47.1 percent in uniform noncitizen status families were female; this difference was statistically significant at the .1 level.

Children differed in racial and ethnic composition depending on whether they were U.S. citizens (Table 4-5). A statistically significantly larger share of noncitizen children relative to citizen children were Latinx or Asian compared to citizen children ($p < .001$). In contrast, a smaller share of noncitizen children versus citizen children reported being White, Black/African American, or Multi-Racial ($p < .001$).

Table 4-5: Racial and Ethnic Distributions, Citizen Children vs. Noncitizen Children, 2008 – 2015

Racial & Ethnic Categories	**Citizen Children**	**Noncitizen Children**
	%	**%**
White	75.7	64.9
Black/African American	14.7	10.3
Asian	4.2	22.3
American Indian/ Alaskan Native	1.2	1.4
Multi-Racial	4.2	1.1
Latinx	22.2	56.7

When dividing noncitizen children by whether they lived in either a mixed-status or uniform noncitizen status family, race and ethnicity differed between the groups[1] (Table 4-6). A much smaller share of noncitizen Asian children lived in mixed-status families than uniform noncitizen families ($p < .001$). Noncitizen children in mixed-status families were statistically significantly more likely to be Latinx and White than noncitizen children in uniform noncitizen status families ($p < .001$).

[1] Because of limited number of observations available for children from Multi-Racial, American Indian/Alaskan Native and Black/African American racial groups by citizenship, statistical significance tests were not run by each racial group.

Table 4-6: Racial and Ethnic Distributions, Noncitizen Children Living in Mixed-Status Families vs. Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015

Racial & Ethnic Categories	Noncitizen Children	
	Living in Mixed-Status Families	**Living in Uniform Noncitizen Status Families**
	%	**%**
White	73.6	58.1
Black/African American	10.3	10.3
Asian	12.9	29.6
American Indian/ Alaskan Native	2.1	.9
Multi-Racial	1.1	1.0
Latinx	71.5	45.0

When looking at children by race and ethnicity, the share that reported being in excellent or very good health differed by citizenship status (Table 4-7). A statistically significant smaller share of White noncitizen children reported being in excellent or very good health compared to White citizen children ($p < .001$). There was a statistically significantly smaller share of noncitizen Latinx children in excellent or very good health compared to citizen Latinx children ($p < .001$).

Table 4-7: Excellent/Very Good Health Status, for Racial Groups and Ethnicity, Citizen vs. Noncitizen Children, 2008 – 2015

Racial Categories & Ethnicity	**Reported Excellent/Very Good Health**	
	Citizen Children	**Noncitizen Children**
	%	**%**
White	85.2	75.6
Black/African American	76.5	79.9
Asian	83.8	82.2
American Indian/ Alaskan Native	71.4	53.2
Multi-Racial	83.8	75.6
Latinx	76.7	72.1

Noncitizen children, as a group, were older than citizen children ($p < .001$, Mean Difference = 3.0, Confidence Interval = 3.2 – 2.8). On average, noncitizen children were 11.5 years old. Whereas citizen children were roughly equally divided among the three age groups, most noncitizen children were in the oldest age category: twelve- to seventeen- year-olds (Table 4-8).

Table 4-8: Children's Age Distribution, by Citizenship Status, 2008 – 2015

Age Categories	Children	
	Citizen Children	Noncitizen Children
	%	%
Five Years Old or Younger	33.2	12.1
Six to Eleven Years Old	33.7	31.5
Twelve to Seventeen Years Old	33.1	56.4

The majority of all children, regardless of age group and citizenship status, reported being in excellent or very good health (Table 4-9). There was no statistically significant difference between citizen and noncitizens in the share of children five years old and younger who reported having excellent or very good health. In contrast, for the older age groups (i.e. 6- to 11-year-olds and 12- to 17-year-olds) the shares of noncitizen children versus citizen children that reported being in excellent or very good health were statistically significant different at the .01 level.

Table 4-9: Children's Excellent/Very Good Health Status, for Age Groups and by Citizenship Status, 2008 – 2015

Age Groups	Children Reported Excellent/Very Good Health	
	Citizen	Noncitizen
	%	%
Five Years Old or Younger	85.8	84.6
Six to Eleven Years Old	83.1	79.0
Twelve to Seventeen Years Old	81.9	74.6

Among noncitizen children, those living in mixed-status families were slightly older than those living in uniform noncitizen status families ($p < .001$, Mean Difference = 1.0, Confidence Interval, 1.3 – .8). The average age among noncitizen children in mixed-status families was 12.1 years old. Among noncitizen children, the largest share in mixed-status and uniform noncitizen status families were ages twelve to seventeen (Table 4-10). Just 7.4 percent of noncitizen children living in mixed-status families were five years old or younger.

Table 4-10: Noncitizen Children's Age Distribution, Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015

	Noncitizen Children	
Age Groups	**Living in Mixed-Status Families**	**Living in Uniform Noncitizen Status Families**
	%	**%**
Five Years Old or Younger	7.4	15.9
Six to Eleven Years Old	32.1	31.0
Twelve to Seventeen Years Old	60.5	53.1

Children without citizenship in mixed-status families had spent a substantial amount of their lives in the United States. Among fifteen- to seventeen-year-olds, 58.3 percent had resided in the United States for at least ten years. Nearly all (92.5%) noncitizen children in mixed-status families between the ages of one to four had lived at least a full year in the United States.

Table 4-11 presents the share of noncitizen children that were in either excellent or very good health by age group and family type. Regardless of age group, the majority of noncitizen children reported being in either excellent or very good health in both mixed and uniform noncitizen status families. Noncitizen children living in mixed-status

families had smaller shares reporting excellent or very good health relative to noncitizen children living in uniform noncitizen status families in all age groups ($p < .01$).

Table 4-11: Age Distribution, Noncitizen Children Living in Mixed-Status Families vs. Uniform Noncitizen Status Families, 2008 – 2015

	Excellent/Very Good Health Status	
	Noncitizen Children	
Age Groups	**Living in Mixed-Status Families**	**Living in Uniform Noncitizen Status Families**
	%	**%**
Five Years Old or Younger	76.8	87.6
Six to Eleven Years Old	75.1	82.2
Twelve to Seventeen Years Old	70.8	78.0

4.1.3 Does Health Differ by Children's Citizenship Status in Mixed Status Families?

Seven of every ten (77.8%) children living in mixed-status families were either in excellent or very good health. A smaller share (68.2%) of children in poor mixed-status families were in either excellent or very good health. There was a statistically significant difference in the share of children in excellent or very good health between poor and non-poor children in mixed-status families ($p < .001$). The author conducted three model specifications for health status for all mixed-status families and then for poor mixed-status families—where all children within the family were living below the federal poverty line (Figure 4-1).

Figure 4-1: Model Specifications for Logistic Regressions on Excellent/Very Good Health Status

	All Mixed-Status Families				**Poor Mixed-Status Families**		
Variable	Model a	Model b	Model c	Model d	Model e	Model f	Model g
Noncitizenship	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X
Female	X	X	X	X	X	X	X

Physical Limitations	X	X	X	X	X
Delay of Care Due to Cost		X			X
Uninsurance			X		

Noncitizenship was a statistically significant negative factor in children's health status in all the statistical models (Table 4-12). Within mixed-status families, relative to their citizen kin, lacking U.S. citizenship decreased a child's probability of being in excellent or very good health by 11.1, 12.8, 13.8, or 14.2 percentage points compared to children with citizenship (after accounting for factors included in Model a, Model c, Model d and Model b, respectively). Compared to kin without a physical limitation, the probability of being in excellent or very good health declined by 52.5 (Model b), 55.9 (Model c) and 53.3 (Model d) percentage points if a child had a physical limitation. Having had care delayed due to cost lowered a child's probability of being in excellent or very good health by .28 relative to kin who did not experience delays in care due to cost (after accounting for factors included in Model c).

Table 4-12: Excellent/Very Good Health Among Children in Mixed-Status Families, Family Level Fixed Effects, Marginal Effects

	All Mixed-Status Families			
	Model a	**Model b**	**Model c**	**Model d**
Noncitizenship	-.111***	-.142***	-.128****	-.138***
(S.E.)	*(.038)*	*(.047)*	*(.036)*	*(.048)*
Age	.004	.004	.005	.004
(S.E.)	*(.005)*	*(.006)*	*(.005)*	*(.006)*
Female	-.046	-.079*	-.062	-.079
(S.E.)	*(.036)*	*(.042)*	*(.039)*	*(.042)*
Physical Limitation		-.525***	-.559****	-.533****
(S.E.)		*(.157)*	*(.099)*	*(.143)*
Delay of Care Due to Cost			-.280****	
(S.E.)			*(.086)*	
Uninsurance				-.009
(S.E.)				*(.062)*

Notes: **** = p ≤ .001; *** = p ≤ .01; ** = p ≤ .05; * = p ≤ .10

Estimators performed on children in poor mixed-status families produced different results than estimators of all children in mixed-status families (Table 4-13). While noncitizenship was statistically significantly associated with the health outcomes for all mixed-status families, lack of citizenship was not statistically significant in models restricted to poor children in mixed-status families. Compared to boys, girls had a decreased probability of being in excellent or very good health among poor children living in mixed-status families (Model f and Model g). After accounting for other factors included in Model g, children that experienced a delay of needed care due to cost had a lower probability of having excellent/very good health compared to children that had not experienced delays in needed care due to cost.

Table 4-13: Excellent/Very Good Health Among Children in Poor Mixed-Status Families, Within Family Fixed-effects, Marginal Effects

	Poor Mixed-Status Families		
	Model e	**Model f**	**Model g**
Noncitizenship	-.035	-.078	-.086
(S.E.)	*(.059)*	*(.077)*	*(.071)*
Age	-.005	-.003	-.000
(S.E.)	*(.003)*	*(.004)*	*(.007)*
Female	-.077	-.124*	-.135**
(S.E.)	*(.056)*	*(.073)*	*(.061)*
Physical Limitation		-.258	-.358
(S.E.)		*(.195)*	*(.248)*
Delay of Care Due to Cost			-.271*
(S.E.)			*(.160)*

Notes: **** = p ≤ .001; *** = p ≤ .01; ** = p ≤ .05; * = p ≤ .10

4.2 Is Needed Healthcare More Frequently Delayed Due to Cost for Noncitizen Children than for Citizen Children?

4.2.1 Delays in Children's Needed Care Due to Cost by Poverty Level

From 2008 to 2015, 3.4 percent of all children—and 3.6 percent of all poor children—had had needed care delayed due to cost in the United States. However, grouping children by citizenship status revealed statistically significant differences between the shares of citizen and noncitizen children with reported delays in needed healthcare due to cost (Table 4-14). Among all children, the share of noncitizen children that had necessary care delayed due to cost was nearly twice as large as the share of citizen children ($p < .001$). The disparity in shares of children that had experienced delays in needed care due to cost by citizenship was largest among poor children ($p < .001$). Nevertheless, even among nonpoor children, a larger share of noncitizens experienced delays in needed healthcare due to cost than citizens ($p < .001$).

Table 4-14: Children Delay of Needed Care Due to Cost, by Poverty Level and Citizenship, 2008 – 2015

Poverty Level	Reported Delay of Needed Care Due to Cost	
	Citizen Children	Noncitizen Children
	%	%
All Children	3.3	7.3
Non-Poor Children	3.3	5.6
Poor Children	3.3	10.0

Table 4-15 presents shares of children that experienced delays in needed care due to cost for noncitizen children by family type and poverty level. A larger of noncitizen children in mixed-status families had experienced delays in needed care due to cost compared to noncitizen children living in uniform noncitizen status families ($p <.1$). However, when looking just among poor and non-poor children by family type,

differences in delays in needed care due to cost were not statistically significant at conventional levels.

Table 4-15: Delay of Needed Care Due to Cost, by Poverty Level, Noncitizen Children Living in Mixed-Status Families vs. Noncitizen Children Living in Uniform Noncitizen Status Families, 2008 – 2015

	Reported Delay of Needed Care Due to Cost	
Poverty Level	**Noncitizen Children Living in Mixed-Status Families**	**Noncitizen Children Living in Uniform Noncitizen Status Families**
	%	**%**
All Children	8.2	6.7
Non-Poor Children	5.8	5.5
Poor Children	11.0	8.9

4.2.2 Uninsured Children's Delays in Needed Care Due to Cost

Nearly one-fifth (19.3%) of all uninsured children living in the United States had experienced delays in needed care due to cost between 2008 and 2015. When divided by citizenship and poverty status, the shares of uninsured noncitizen children that had experienced delays in needed care due to cost were slightly smaller than the national average for all children (Table 4-16). Among poor uninsured children, similar shares of citizens and noncitizens had experienced delays in needed care due to cost (no statistically significant difference at conventional levels). Differences between citizen and noncitizen children were largest among nonpoor children. One-fifth of nonpoor citizen children without insurance had experienced a delay in needed care due to cost compared to 12.9 percent of nonpoor noncitizen uninsured children ($p < .001$).

Table 4-16: Shares of Uninsured Children's Delay of Needed Care Due to Cost, by Poverty Level and Citizenship Status, 2008 – 2015

Uninsured Children	Reported Delay in Needed Care Due to Cost	
	Citizen	Noncitizen
	%	%
All	19.8	16.0
Non-Poor	20.0	12.9
Poor	21.2	18.7

Poor uninsured noncitizen children had the highest rate of delays in needed care due to cost, regardless of family type. Similar shares of uninsured noncitizen children experienced delays in needed care due to cost by family type and poverty level (Table 4-17). The differences in delays in needed care due to cost between noncitizen uninsured children living in mixed-status and uniform noncitizen status families were not statistically significant at conventional levels.

Table 4-17: Shares of Uninsured Noncitizen Children's Delay of Needed Care Due to Cost, by Poverty Level and Mixed-Status or Uniform Noncitizen Status Families, 2008 – 2015

Uninsured Noncitizen Children	Reported Delay of Needed Care Due to Cost	
	Living in Mixed-Status Families	Living in Uniform Noncitizen Status Families
	%	%
All	15.2	16.9
Non-Poor	11.9	13.7
Poor	17.8	20.2

4.2.3 Within mixed-status families, is needed healthcare more frequently delayed due to cost for noncitizen children than for citizen children?

The author constructed logistic models that compare delays of needed healthcare due to cost between citizen and noncitizen children within mixed-status families (Figure 4-2).

Figure 4-2: Model Specifications for Logistic Regressions on Delay of Care Due to Cost

	All Mixed-Status Families		**Poor Mixed-Status Families**	
Variable	Model a	Model b	Model c	Model d
Noncitizenship	X	X	X	X
Age	X	X	X	X
Female	X	X	X	X
Excellent/Very Good Health	X	X	X	X
Uninsurance		X		X

Only 5.6 percent of all children in mixed-status families had delayed needed healthcare due to cost. However, logistic models showed that certain factors were statistically significantly associated with a child's probability of experiencing delays in needed care due to cost (Table 4-18). In Model a, the probability of having had a delay in needed care due to cost declined for children in excellent or very good health by 24.6 percentage points relative to children that were in either good, fair or poor health. Children lacking citizenship had a higher probability of having needed care delayed due to cost relative to their kin that possessed U.S. citizenship after accounting for factors included in Model b. Notably, after controlling for being uninsured in Model b, children lacking citizenship had a 10.1 percentage point higher probability of experiencing delays in needed care due to cost relative to their U.S. citizen kin. In Model b, compared to their kin that were

insured, children without health insurance had a higher probability of delaying care due to cost.

Table 4-18: Delay in Needed Care Due to Cost, Children in Mixed-Status Families, Within Family Fixed-effects, 2008 – 2015

	All Mixed-Status Families	
	Model a	**Model b**
Noncitizenship	.328	.101**
(S.E.)	*(.201)*	*(.042)*
Age	.002	-.004
(S.E.)	*(.011)*	*(.005)*
Female	.004	.012
(S.E.)	*(.054)*	*(.030)*
Excellent/Very Good Health	-.246**	-.205
(S.E.)	*(.097)*	*(.156)*
Uninsured		.493***
(S.E.)		*(.186)*

Note: **** = $p \leq .001$; *** = $p \leq .01$; ** = $p \leq .05$; * = $p \leq .10$

Table 4-19 shows results from Models c and d, which were conducted on a subset of mixed-status families that were living below the federal poverty line. When uninsurance was not included in the estimator (Model c), none of the individual factors were statistically significantly associated with delay of needed care due to cost. However, the direction and magnitude of the relationship between delay of needed care due to cost and noncitizenship, gender, age as well as excellent/very good health were similar in both Models c and d. After accounting for factors included in Model d, lacking U.S. citizenship statistically significantly increased a child's probability of experiencing a delay in needed care due to cost by 20.1 percentage points within poor mixed-status families. Lacking insurance increased the probability of a child experiencing a delay in needed care due compared to their insured kin by 53.2 percentage points in Model d. Being in excellent or very good health (as opposed to good/fair or poor health) lowered a

child's probability of experiencing delays in needed care due to cost in both models of poor mixed-status families, but was statistically significant only in Model d.

Table 4-19: Delay in Needed Care Due to Cost, Poor Children in Mixed-Status Families, Within Family Fixed-effects, 2008 – 2015

	Poor Mixed-Status Families	
	Model c	**Model d**
Noncitizenship	.340	.201**
(S.E.)	*(.306)*	*(.098)*
Age	.006	.002
(S.E.)	*(.008)*	*(.009)*
Female	.052	.046
(S.E.)	*(.084)*	*(.055)*
Excellent/Very Good Health	-.293	-.414****
(S.E.)	*(.240)*	*(.080)*
Uninsured		.532**
(S.E.)		*(.257)*

Note: **** = $p \leq .001$; *** = $p \leq .01$; ** = $p \leq .05$; * = $p \leq .10$

4.3 Are noncitizen children less likely to be publicly insured than citizen children?

4.3.1 Uninsurance and Children's Poverty Level

Nearly seven out of every one hundred children (6.9%) were uninsured in the United States between 2008 and 2015; among poor children, at least eight out of every one hundred children (8.5%) lacked health insurance. Uninsurance rates varied substantially when grouping children by citizenship and poverty level, however (Table 4-20). The shares of uninsured noncitizen and citizen children were substantial for poor and nonpoor children ($p < .001$), but poor children exhibited the largest disparity by their citizenship status. Poor noncitizen children were over six times more likely to be uninsured than poor citizen children.

Table 4-20: Percentage of Uninsured Children, by Poverty Level and Citizenship Status, 2008 – 2015

Poverty Level	Uninsured Children	
	Citizen	Noncitizen
	%	%
All Children	6.1	36.2
Non-Poor Children	5.7	30.2
Poor Children	6.7	44.2

Lack of insurance differed among noncitizen children depending on whether they lived in mixed-status or uniform noncitizen status families for all children ($p <. 001$), poor children ($p < .001$), and nonpoor children ($p <.01$). The difference in the rate of uninsured was greatest by family type between poor noncitizen children (Table 4-21).

Table 4-21: Shares of Uninsured Noncitizen Children, by Poverty Level and Living in Mixed-Status or Uniform Noncitizen Status Families, 2008 – 2015

Poverty Level	Uninsured Noncitizen Children	
	Living in Mixed-Status Families	Living in Uniform Noncitizen Status Families
	%	%
All Children	43.4	30.4
Non-Poor Children	34.9	27.3
Poor Children	51.2	35.9

Overall, 25.8 percent of children in mixed-status families, regardless of their citizenship, were uninsured. Lacking U.S. citizenship increased a child's probability of being uninsured by 10.9 percentage points compared to children with citizenship from 2008 to 2015, after accounting for family level fixed-effects as well as each child's age, gender and reported health status (Table 4-22). An increase in age was also statistically significantly associated with a small increase in the probability of a child being uninsured, after accounting for other factors in the model.

Table 4-22: Uninsurance, Children in Mixed-Status Families, Within Family Fixed-effects, 2008 – 2015

Factors	Marginal Effects
Noncitizenship	.109***
(S.E.)	*(.038)*
Age	.007****
(S.E.)	*(.001)*
Female	-.010
(S.E.)	*(.020)*
Excellent/Very Good Health	-.006
(S.E.)	*(.031)*

Note: **** = p ≤ .001; *** = p ≤ .01; ** = p ≤ .05; * = p ≤ .10

4.3.2 Non-Poor Children's Insurance Composition

Among children in the United States living in families with incomes above the poverty level (i.e. nonpoor), private health insurance was the dominant source of coverage from 2008 to 2015. Insurance composition among nonpoor children differed by citizenship status, however (Table 4-23). Whereas 67.0 percent of nonpoor citizen children were covered exclusively by private health insurance, less than half (41.9%) of nonpoor noncitizen children were covered by private health insurance. If you combine public/private and public insurance coverage together, nonpoor noncitizen and citizen children's health insurance coverage differed by less than one percentage point.

Table 4-23: Nonpoor Children's Insurance Composition, by Citizenship Status, 2008 – 2015

Insurance Composition	Nonpoor Children	
	Citizen	Noncitizen
	%	%
Uninsured	5.7	30.2
Private	67.0	41.9
Public	23.4	26.0
Public/Private	4.0	1.9

Among nonpoor noncitizen children, the composition of insurance coverage differed by those living in mixed-status families as opposed to uniform noncitizen status families (Table 4-24). Nonpoor noncitizen children living in mixed-status families had statistically significantly lower rates of private insurance coverage compared to their counterparts living in uniform noncitizen status families ($p < .001$). Nonpoor noncitizen children in mixed-status families had statistically significantly higher rates of being uninsured despite also having statistically significantly larger shares covered by public health insurance ($p < .001$, $p < .01$, respectively).

Table 4-24: Nonpoor Noncitizen Children's Insurance Composition, Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015

Insurance Composition	Nonpoor Noncitizen Children	
	Living in Mixed-Status Families	Living in Uniform Noncitizen Status Families
	%	%
Uninsured	34.9	27.3
Private	30.6	49.0
Public	32.8	21.8
Public/Private	0.0	0.0

4.3.3 Poor Children's Insurance Composition

Among poor children in the United States, public health insurance was the dominant source of coverage from 2008 to 2015. Poor children's public health insurance coverage differed dramatically by citizenship status, however (Table 4-25). Whereas 83.4 percent of poor citizen children were covered exclusively by public health insurance, less than half (47.8%) of poor noncitizen children were covered by public health insurance. Poor noncitizen children had a statistically significant lower rate of public health insurance coverage relative to poor citizen children ($p < .001$). Private health insurance

coverage was similar for poor citizen children and poor noncitizen children (the difference in private insurance coverage was not statistically significant at conventional levels). The share of poor children covered by a combination of public/private insurance for citizen versus noncitizen children differed but covered very small shares of each group ($p < .001$). If one combined the private health insurance and private/public health insurance, the difference in coverage between poor citizen and poor noncitizen children was less than two percentage points.

Table 4-25: Poor Children's Insurance Composition, by Citizenship Status, 2008 – 2015

Insurance Composition	Poor Children	
	Citizen	Noncitizen
	%	%
Uninsured	6.7	44.2
Public	83.4	47.8
Private	7.3	7.7
Public/Private	2.6	0.3

Among poor noncitizen children, the composition of insurance coverage differed by those living in mixed-status families as opposed to uniform noncitizen status families (Table 4-26). Poor noncitizen children living in mixed-status families had statistically significantly lower rates of public and private insurance coverage compared to their counterparts living in uniform noncitizen status families ($p < .10$, $p < .01$, respectively).

Table 4-26: Poor Noncitizen Children's Insurance Composition, Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015

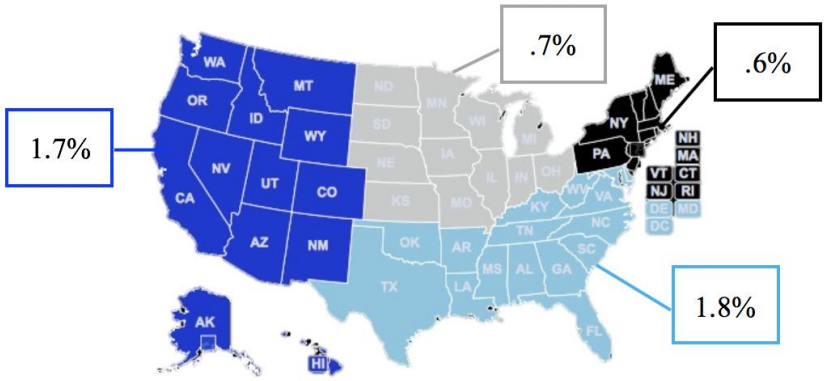
Insurance Composition	Poor Noncitizen Children	
	Living in Mixed-Status Families	Living in Uniform Noncitizen Status Families
	%	%
Uninsured	51.2	35.9
Public	44.7	51.5

Private	3.8	12.3
Public/Private	0.4	0.3

4.3.5 Poor Children's Region of Residence and Public Health Insurance Coverage

Within any given region from 2008 to 2015, fewer than five out of every one hundred poor children lacked citizenship (4.8%). Noncitizen children represented less than one percent of poor children living in the Northeast and North Central Midwest regions (Figure 4-3). Among poor children living in the South, 1.8 percent lacked citizenship; in the West 1.7 percent of all children living in poverty were not citizens (Figure 4-3). Roughly seven of every ten poor children without citizenship lived in either the South (37.0%) or in the West (34.9%) from 2008 to 2015. Nevertheless, none of the regions had a statistically significantly larger share of poor (as opposed to non-poor) noncitizen children residents from 2008 to 2015.

Figure 4-3: Map of United States, Color-Coded by Region, Call-Out Boxes Show Percent of Poor Children that Lack U.S. Citizenship in Each Region



Notes: Northeast in black includes: CT, ME, MA, NH, NJ, NY, PA, RI, VT. North Central/Midwest in grey includes: IL, IN, IA, KS, MI, MN, NE, ND, OH, SD, WI. Southern in light blue includes: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, MS, AL, TX, AR, OK, LA. West in dark blue includes: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY.

Public health insurance coverage varied by region for poor children by citizenship status (Table 4-30). In all regions noncitizen poor children had statistically significantly lower rates of public health insurance coverage relative to poor citizen children ($p < .001$). The largest disparity in public health insurance coverage between poor noncitizen and poor citizen children was in the South, followed by the West. In the South fewer than three of every ten poor noncitizen children were publicly insured, but nine of every ten poor citizen children were publicly insured.

Table 4-27: Poor Children's Public Health Insurance Coverage, by Different Regions of the United States and Citizenship Status, 2008 – 2015

Region of Residence	Poor Children's Public Health Insurance Coverage	
	Citizen	Noncitizen
	%	%
Northeast	94.0	79.2
Central/Midwest	93.3	76.4
South	91.0	28.8
West	89.5	56.7

Note: Coverage rates are for poor children that are not covered by private health insurance.

In all regions, noncitizen poor children in mixed-status families had lower rates of public health insurance coverage than noncitizen poor children in uniform noncitizen families, with the differences being statistically significant in the Northeast and in the South (Table 4-31).

Table 4-28: Poor Noncitizen Children's Public Health Insurance Coverage, by Different Regions of the United States and Living in Mixed-Status Families or in Uniform Noncitizen Status Families, 2008 – 2015

	Poor Noncitizen Children's Public Health Insurance Coverage	
	Living in Mixed-Status Families	**Living in Uniform Noncitizen Status Families**
	%	**%**
Northeast	69.3	86.7
Central/Midwest	71.0	82.4
South	20.6	38.4
West	56.2	57.5

Note: Coverage rates are for poor children that are not covered by private health insurance.

4.3.6 Within mixed-status families, are noncitizen children less likely to be publicly insured than citizen children?

The author conducted the same model specification for public health insurance coverage during 2008 to 2015 for all regions, for poor mixed-status children for all regions, and then for all mixed-status families living in South or West regions (Figure 4-4).

Figure 4-4: Model Specifications for Logistic Regressions on Public Health Insurance Coverage

	All Mixed-Status Families	**Poor Mixed-Status Families**	**All Mixed-Status Families, West & South**
Variable	**Model a**	**Model b**	**Model c**
Noncitizenship	X	X	X
Age	X	X	X
Female	X	X	X
Excellent/Very Good Health	X	X	X

Compared to their citizen kin, lacking citizenship statistically significantly lowered the probability of a child being covered by public health insurance within mixed-status families in the United States (Model a) and within mixed-status families living in

either the South or the West (Model c) (Table 4-32). Additionally, a small increase in age was associated with a decreased probability of being publicly insured for both Model a and Model c. When restricting the model to poor mixed-status families, age was the only statistically significant factor associated with public health insurance coverage.

Table 4-29: Public Health Insurance Coverage, Family Level Fixed Effects, Marginal Effects

	All Mixed-Status Families	**Poor Mixed-Status Families**	**All Mixed-Status Families, West & South**
	Model a	**Model b**	**Model c**
Noncitizenship	-.075***	-.095	-.090***
(S.E.)	*(.024)*	*(.087)*	*(.028)*
Age	-.006****	-.004****	-.007****
(S.E.)	*(.001)*	*(.001)*	*(.001)*
Female	.017	.020	.022
(S.E.)	*(.015)*	*(.033)*	*(.019)*
Excellent/Very Good Health	-.018	-.089	-.015
(S.E.)	*(.021)*	*(.067)*	*(.027)*

Note: **** = $p \leq .001$; *** = $p \leq .01$; ** = $p \leq .05$; * = $p \leq .1$

Chapter 5: Discussion

5.1 Dissertation Approach

Fewer than three of every one hundred children living in the United States between 2008 and 2015 lacked U.S. citizenship, but 40.5 percent of these noncitizen children were poor. Noncitizen children were also racially and ethnically diverse: over half (56.7%) reported being Latinx and one-fifth (22.3%) reported being Asian. Among these children lacking U.S. citizenship, 44.1 percent were members of mixed-status families—where one or more child lacked U.S. citizenship and one or more of their kin possessed U.S. citizenship. Guided by the Social Determinants of Health conceptual framework, the author posited that *foreign-born children's opportunities to gain U.S. citizenship,* combined with *eligibility restrictions on Medicaid/CHIP by citizenship status for persons of all ages* were fundamental causes for disparities in health outcomes, access to care and health insurance coverage between noncitizen and citizen children in the United States. She addressed three research questions in this dissertation:

1. Within mixed-status families, does reported health status differ by children's citizenship status?
2. Within mixed-status families, is needed healthcare more frequently delayed due to cost for noncitizen children than for citizen children?
3. Within mixed-status families, are noncitizen children less likely to be publicly insured than citizen children?

The author decided on a quasi-experimental design to address her research questions because random assignment of children's citizenship was neither feasible nor ethical. The author employed fixed-effects at the family level as her identification

strategy to make causal inferences between citizenship and health insurance coverage, delayed care due to cost and health status. By comparing children within the same family via family level fixed-effects, the author controlled for many of the confounding social, cultural and economic factors that affect insurance coverage, access and health status and persuasively isolates the impact of citizenship on these outcomes. The strength of the family level fixed-effects estimators allowed the author to produce persuasive empirical findings that isolated the role that lack of U.S. citizenship plays in children's health, access to care and health insurance coverage.

The fixed-effects at the family level identification strategy is susceptible to bias and inefficiency due to measurement error, omitted variable bias and confounding due to unobservable factors. The author reviewed these threats to validity in turn and concluded that each were sufficiently minimized in the estimators employed here. A major threat to external validity was lack of generalizability of results to noncitizen children living in entirely immigrant families, unaccompanied minors, or noncitizen children that do not have parents or guardians in the United States. Another limitation is that the author was unable to differentiate between immigration statuses of noncitizen children in the analyses. The author concluded that examining exclusively mixed-status families substantially contributes to our knowledge of how lack of citizenship impacts children's health, access to care and health insurance coverage despite not being able to generalize findings to all noncitizen children living in the United States or being able to differentiate between noncitizen children's immigration statuses.

5.2 Reported Health Status

Results from this dissertation suggest that noncitizen children do not possess health status advantages relative to their citizen peers. While a small fraction of either citizen or noncitizen children reported being in “fair” or “poor” health, a smaller proportion of noncitizen children reported being “excellent” health than citizen children per linear combination tests of mean differences. Logistic estimators of reported excellent or very good health status offered additional evidence that, among children within the same family, lack of citizenship lowered the probability of a child being in excellent or very good health—even after controlling for other individual factors and employing family level fixed-effects.

On average, children without U.S. citizenship were three years older than citizen children. Whereas the average age of all noncitizen children was 11.5, the average age for citizen children was 8.5. Noncitizen children living in mixed-status families were the oldest on average of all the groups, with an average age of 12.1. Nevertheless, among children grouped by ages 6-11 and 12-17, noncitizen children had statistically significantly smaller shares reporting excellent or very good health compared to citizen children in their same age group. Noncitizen children living in mixed-status families had smaller shares reporting excellent or very good health relative to noncitizen children living in uniform noncitizen status families in all age groups. Regressions using family level fixed-effects included age as a predictor of health status; age was not a practically or statistically significant factor driving reported excellent or very good health status in any of the regression models examining health status.

Health status differences between citizen and noncitizen children are likely to be influenced by racial and ethnic differences as well. Descriptive statistics of children revealed that noncitizen children, as a group, had a different racial and ethnic distribution than citizen children. Nevertheless, among White children, a statistically smaller share of noncitizens reported being in excellent or very good health relative to citizens. Similarly, a smaller share of noncitizen Latinx children reported being in excellent or very good health compared to citizen Latinx children.

Analyses of all mixed-status families that controlled for family level attributes—including race, ethnicity, income, unobserved cultural norms, and shared genetic traits—showed that lacking citizenship (as opposed to being a U.S. citizen) statistically significantly lowered a child's probability of being in excellent or very good health. Notably, although the author found that lack of U.S. citizenship statistically significant increased a child's probability of being uninsured in mixed-status families (Table 4-22), even after controlling for a child's being uninsured, noncitizenship still negatively impacted children's probability of being in excellent or very good health status. The results of the logistic model indicate that aspects of lacking citizenship, beyond a noncitizen child's likelihood of being uninsured, lowers children's health outcomes. When the author restricted logistic models to poor mixed-status families, citizenship was not statistically significantly associated with reporting excellent or very good health. The lack of statistical significance among poor mixed-status families might be due to the small number of observations eligible for inclusion in restricting the estimator to poor mixed-status families.

Of note, while a statistically significant smaller share of noncitizen children reported being in excellent or very good health compared to citizen children, a considerably smaller share of noncitizen children reported having a physical limitation compared to citizen children. Unfortunately, the author was unable to parse out a statistically reliable estimate of the relationship between citizenship and physical limitations that controlled for cultural bias and family characteristics using logistic models because so few children—regardless of citizenship—had a physical limitation in mixed-status families.

5.3 Delay in Care Due to Cost

Between 2008 and 2015 fewer than four of every one hundred children had experienced a delay in needed healthcare due to cost. The share of noncitizen children that had necessary care delayed due to cost was nearly twice as large as the share of citizen children, however. The disparity in shares of children that had experienced delays in needed care due to cost by citizenship was largest among poor children. Whereas the rates of citizen children's reported delays in needed healthcare due to cost were nearly identical for poor and nonpoor citizen children; among noncitizen children the share that had reported delays in needed care due to cost were largest for noncitizen children living in poverty. Notably, the rate of delay in needed healthcare was 5.8 percentage points larger for poor noncitizen children compared to nonpoor noncitizen children. The distributions by poverty status of all noncitizen children and uninsured noncitizen children that experienced delays due to cost suggest that policies and programs that

eliminate financial barriers to care might be especially effective for noncitizen children that are living in poverty.

After controlling for individual factors and employing family level fixed-effects, lacking citizenship increased the probability of a child having experienced delays in accessing needed care due to cost relative to her/his/their citizen kin. The magnitude of the impact of noncitizenship on delays in needed care due to cost was larger in estimators restricted to poor mixed-status families compared to estimators the included all mixed-status families. More research is required to better understand the types of care that is delayed due to cost for noncitizen children, particularly noncitizen children in poor mixed-status families.

Importantly, when uninsurance was controlled for in the models for all mixed-status families and poor mixed-status families, noncitizenship alone was still associated with an increased probability of having experienced a delay in needed care in the last year. These results suggest that noncitizenship embodies unique issues that increased a child's probability of experiencing a delay in needed care above and beyond the relationship between lack of citizenship and lack of health insurance.

5.4 Public Health Insurance

Although noncitizen children were more likely to be uninsured relative to citizen children regardless of poverty; the largest differences in lack of insurance among nonpoor children seemed to be due to differences in private health insurance. Among poor children in the United States, public health insurance was the dominant source of coverage from 2008 to 2015. Poor children's insurance composition differed dramatically

by citizenship status, however. Whereas more than 80 percent of poor citizen children were covered by public health insurance, less than half of poor noncitizen children were covered by public health insurance. The differences in poor children's health insurance coverage is striking within the context that private coverage was low and very similar for poor children regardless of citizenship status. Whereas public health insurance reaches poor citizen children who would otherwise be uninsured, it fails to do that same for noncitizen poor children, leaving noncitizen poor children with six times the rate of being uninsured relative to their poor citizen peers.

Although poor noncitizen children represented a very small fraction of all poor children in any given Census Bureau region of the United States, 71.9 percent of all noncitizen poor children lived in either the South or the West regions of the country. As of 2018, 31 states no longer mandated the five-year ban from accessing Medicaid for legal permanent residents and a handful of states (CA, IL, NY, OR and WA) and the District of Columbia have eliminated eligibility by immigration status altogether. Despite these policies, in all regions noncitizen poor children had statistically significantly lower rates of Medicaid/CHIP coverage relative to poor citizen children ($p < .001$). The largest disparities in Medicaid/CHIP coverage were in the South and West regions, where poor noncitizen children's coverage lagged poor citizen children's coverage by 62.2 percentage points and 32.8 percentage points, respectively. In the South, just one-fifth of poor noncitizen children living in mixed-status families were covered by Medicaid/CHIP. Including immigrants' sponsor incomes in assessing eligibility as well as low English language proficiency, unfamiliarity with the U.S. healthcare system, and other factors hamper immigrant children's enrollment in Medicaid/CHIP. Yet, even after controlling

for families' incomes, language, culture, race/ethnicity and other unobservable factors, lacking U.S. citizenship alone lowered a poor child's probability of being covered by Medicaid/CHIP compared to kin that possessed U.S. citizenship.

5.5 Policy Implications and Recommendations for Future Research

This dissertation presented empirical evidence that noncitizen living in mixed-status families have comparatively smaller shares reporting being in excellent or very good health, more frequent delays in needed care due to cost and lower rates of public health insurance coverage relative to citizen children nationwide and relative to noncitizen children living in uniform status households. Understanding the distribution of noncitizen children in mixed-status families across the United States, their level of poverty, age, and insurance coverage is instrumental to inform useful policy prescriptions to address their needs. The adverse political environment makes research highlighting the disparities and vulnerabilities for noncitizen children, particularly those living in mixed-status families, even more acute.

The healthy immigrant paradox has been stressed in recent research as a response to increasing anxiety of the potential burden immigrants would have on the U.S. healthcare system. Results of this dissertation suggest that noncitizen children living in mixed-status families are unlikely to possess health advantages relative to native-born peers. Failing to be healthier than native-born children, noncitizen children living in mixed-status families likely will need to access care and be insured to be productive healthy adults. Delays in needed healthcare due to cost is systemic in the United States. Delays in needed healthcare among noncitizen children seem to become most prevalent

among the poor. Public health insurance is a crucial government intervention available to lower financial barriers to care for poor children and families.

So far, many states in the South, including Florida, Kentucky, West Virginia and Tennessee have experienced significant demographic changes due to increased migration relative to their native population growth (Migration Policy Institute, 2010-2017). Persistent low public health insurance coverage among poor noncitizen children in the face of demographic changes in the South are cause for concern. Without any policy changes, the author is largely pessimistic that federal or state policies will reduce inequities in health status, access to care or Medicaid/CHIP coverage driven by children's lack of citizenship found in these analyses.

There are a few policy options that would improve noncitizen children's access to care and Medicaid/CHIP coverage. One possibility would be to mandate that all states eliminate the five-year ban from Medicaid/CHIP coverage for children and pregnant women that possess qualified immigration statuses. The effectiveness of this option will be muted if the current Administration's proposal to include Medicaid participation in public charge determinations is implemented. Another option would be for Congress to eliminate the immigration status eligibility requirements for Medicaid/CHIP applicants aged 17 years-old and younger. Within this context, applicants that show proof of age between 0 and 17 would not then be required to furnish any immigration status documents. Assessing whether any savings of removing the administrative burden related to verifying children's immigration status eligibility might offset expenditures on additional noncitizen children covered by Medicaid/CHIP is outside the scope of this dissertation. However, this policy might be budget neutral or even cost-effective. In the

absence of clear federal leadership in making Medicaid/CHIP accessible to all children, regardless of citizenship, noncitizen children's coverage is likely to be inequitable across states. That said, an incremental step toward expanding federal matching funds to cover noncitizen children currently not eligible for Medicaid/CHIP coverage would be to allow states motivated to expand access to do so via the Sec 1115 waivers.

As noted, lacking citizenship was negatively associated with delay in needed healthcare due to cost even after controlling for uninsurance. In light of this finding, extending a pathway to citizenship for childhood arrivals in the United States for noncitizen children that fulfill requirements for DACA may be exceptionally important in eliminating inequities in financial barriers to healthcare access found in analyses conducted here. Congress has recently considered legislation to reform country numerical limits for naturalization, which result in exceptionally long wait-times for family-sponsored and employer-sponsored green cards for Indian and Chinese nationals (National Immigration Forum, 2019). These efforts stalled in late 2019 and it is unclear whether or when Congress might take up similar legislation in 2020. Efforts to shorten the time required for adults from all countries to gain U.S. citizenship through naturalization would help their foreign-born noncitizen children as well.

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