Reducing Child Health Disparities with Health Policies: Is Health Reform Enough?

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Abstract

Reducing Child Health Disparities with Health Policies: Is Health Reform Enough?

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Understanding whether healthcare policies can narrow and eliminate racial/ethnic disparities in health care access and utilization is an important public health issue. This dissertation examines whether two reforms, the Massachusetts (MA) health care reform law (Chapter 58) and the Patient Protection and Affordable Care Act (ACA), reduced racial/ethnic-related disparities in health care access and utilization between Hispanic and NH-white children. The first aim of this study examined the long-term effects of the MA health reform on disparities in insurance access, utilization of care, and health status among Hispanic children compared to non-Hispanic white children. The second and third aims examined the short-term effects of the ACA on disparities among Hispanic children compared to non-Hispanic white children. The second aim evaluated the impact of the ACA on insurance access and utilization of health care, and the third aim examined ACA impacts on financial burden due to medical costs experienced by the child's family.

Data from the National Survey of Children's Health and the National Health Interview Survey were evaluated before and after implementation of the MA health reform (aim 1) and the ACA

insurance expansion in 2014 (aims 2 & 3). The study subjects were children ages 0 to 17 years old. The impact of insurance expansion through health reform on disparities was evaluated using a triple-difference (difference-in-difference-in-difference, or DDD) analysis, which controlled for events not captured by the covariates that can affect the outcomes. Each aim utilized a nonequivalent pretest/posttest comparison group study design. For the first aim, children living in Massachusetts were the intervention group, and children living in surrounding states (Rhode Island, New Hampshire, and Connecticut) were in the comparison group. For the second and third aim, the intervention group includes children who were not eligible for Medicaid/CHIP before reform and whose family income was <400% of the federal poverty level (FPL). The two comparison groups were composed of children eligible for Medicaid/CHIP before and after reform (the Medicaid/CHIP group), and children whose family income was at or above 400% of the FPL (the 400% FPL group).

The MA Health Reform did significantly narrow disparities between Hispanic and NH-white children for consistent health insurance coverage; no changes were evident for health outcome measures. The ACA significantly improved insurance coverage by approximately 4-percentage points only among children in the Medicaid/CHIP group for Hispanic and NH-white children. However, insurance coverage disparities between Hispanic and NH-white children did not change significantly after insurance expansion for the intervention and 400% FPL comparison groups. Family financial burden disparities were not evident between Hispanic and NH-white children and their families. However, there was a significant reduction in high financial burden for both racial/ethnic groups in the Medicaid/CHIP comparison group post-ACA insurance reform.

This study found that after implementation of both health reforms, Hispanic children continue to fall behind NH-white children in having health insurance coverage and in utilizing preventive health care services. Additional interventions targeted at Hispanic families are needed to improve child health disparities in insurance access. Other reform efforts besides improving insurance access are also needed to improve disparities in preventive care utilization. This study underscores the need for quasi-experimental studies of racial/ethnic disparities in health and health care in the future.

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Chapter 1

Introduction

In 2000, there were 8.5 million uninsured children in the U.S., which decreased to about 3.8 million by 2015. Improvements in health care access spurred by reform efforts, such as the Massachusetts (MA) health care reform law (Chapter 58) and the Patient Protection and Affordable Care Act (ACA), may have had a significant impact on the health and healthcare of children. Insurance expansions efforts through health reform have had beneficial effects on low-income children in the past through the implementation of Medicaid and the Children's Health Insurance Program (CHIP).[1,2] Research efforts evaluating the MA Health Reform and ACA have focused on adults rather than children, mainly because there are more uninsured adults than children, and even fewer studies have focused on racial/ethnic disparities among U.S. children.[3] Therefore, the purpose of this study is to evaluate the impact of the most recent state and national health reform efforts on health care access, utilization, financial burden disparities between Hispanic and non-Hispanic (NH)-White children and their families.

This introductory chapter begins with a brief background of the impacts of rising health care costs on U.S. families and the latest political efforts to moderate this effect. It will also outline the study design, which includes specific study aims developed to evaluate these policy interventions; discuss how the study is innovative; and provide a framework for this study, which includes an explanation of the conceptual model that informs the study design.

Background

I. How Rising Health Care Costs Influenced Access to Health Insurance for U.S. Families.

Health care costs rose faster than income growth for the average U.S. family during the past few decades.[4] One study by Auerbach and Kellermann found that the median income of a family of four increased from $76,000 in 1999 to $99,000 by 2009 (a 30% increase); however, out-of-pocket costs for health care increased from $135 to $235 (74% increase), and annual insurance premiums increased from $490 to $1,115 (228% increase).[5] Since health care costs and health insurance premiums outpaced family incomes, affording insurance became a significant challenge for those without access to public or employer-based insurance.[5]

Rising premiums drove healthy individuals out of the self-insured market,[6] which left sicker enrollees who were willing to pay the higher premiums of self-insured health plans.[7] This resulted in a "death spiral" of insurance companies continually raising premiums over time in response to having fewer healthy people enrolled to cover the costs of the sick enrollees.[6,7] U.S. health care was in a crisis with costs rising out-of-control. In an effort to curb this phenomenon and improve health care quality and public health, the state legislature of Massachusetts enacted health care reform law (Chapter 58). The Obama administration's national campaign for health care reform followed in the midst of the U.S. economic recession in 2009.

II. Latest Political Efforts to Improve Health Care

The Massachusetts health reform and the Patient Protection and Affordable Care Act were implemented to improve access to care for middle and low-income families who did not qualify for government assistance prior to enactment. Both the MA health reform and ACA aim to increase access to care and curb health care costs by instituting an individual health insurance mandate and reforming the health insurance market as described below:

i. The MA health reform, enacted in 2006 for all Massachusetts residents, established the *Commonwealth Health Insurance Connector* as a health exchange website offering access to unsubsidized and sliding-scale subsidized insurance plans for households up to 300% of the Federal Poverty Level (FPL), and fully subsidized plans for those less than 150% FPL. Prior to enactment, MA passed laws to protect residents with pre-existing conditions from being refused coverage by insurance companies or having to pay higher premiums, and established a maximum amount of out-of-pocket costs covered by residents. Medicaid and CHIP were expanded to children up to 300% FPL, and Medicaid was expanded to parents up to 133% FPL and for pregnant women up to 200% FPL. MA also enacted a mandate that required individuals to have insurance coverage or pay a penalty; however, households up to 150% FPL were exempt.

ii. The ACA, enacted in 2010 for the entire nation, had similar features to the MA health reform. *Healthcare.gov* was established as a health exchange website offering access to sliding-scale subsidized insurance plans for households from 133% FPL to 400% FPL. Eleven states and the District of Columbia developed their own health exchanges and the rest utilized the federal marketplace (Healthcare.gov). The ACA also passed laws to

protect residents with pre-existing conditions, established a cap for out-of-pocket costs, and established an individual mandate that requires insurance coverage for U.S. citizens and legal residents or pay a penalty, which went into effect in 2014. However, states have the option to expand Medicaid to all age-eligible U.S. citizens and legal residents up to 133% FPL. By 2015, 29 states and Washington, D.C., expanded Medicaid.[8]

The Massachusetts Health Reform and Affordable Care Act have not only expanded health insurance coverage to reduce uninsurance, but have also reformed how health care is organized and delivered in health care systems. Thus, the improvements in health systems spurred by the MA health reform and ACA may have a significant impact on the health and health care of U.S. families. Overall, studies have shown that those who benefit the most from having health insurance are disadvantaged groups, such as the poor and people in critical or sensitive periods of their life such as childhood and pregnancy.[9,10] With this in mind, both health reforms have the potential to improve the health of minority children and reduce the financial burden among minority families, who tend to be less advantaged and have worse health outcomes than non-Hispanic (NH)-white residents.[11–13]

Impact of State and Federal Health Reforms on Racial/Ethnic Disparities in Children's Health and Health Care

I. Study Aims

Whether health reform has an impact on health and health care is a highly debated topic in the research, medical, and political arenas. Studies have shown that insurance expansions have beneficial effects on children.[1,2] Most studies of these reforms have focused on adults,

mainly because there were more uninsured non-elderly adults than children before enactment of the MA health reform (in 2005, 9.2% vs. 3.0%)[14] and the ACA (in 2010, 21.1% vs. 8.2% in the U.S.).[15] More research is needed about the effects of health reform, specifically insurance reform, on children and their families.[3]

Increasing access to care does increase preventive service use, which happens to be a very price sensitive service[16] and an area where minority children have the greatest need and potential for benefit.[17] Yet, improving access may have unexpected consequences, such as increasing the number of unnecessary health services used.[9,16,18,19] Nonetheless, a parent's decision to use health services for their child tends to be less price sensitive than for themselves,[16,20] thus suggesting that the MA health reform and the ACA can yield different effects on utilization of care among children than in adults. This increases the importance of refining our understanding of health care utilization among minority children to target future interventions and health policies, which have the potential to improve the health of minority children.[16]

Of additional concern is the impact of recent health reforms on racial/ethnic disparities in childhood. In 1997, children's access to care significantly improved following insurance expansion through the State Children's Health Insurance Program (SCHIP).[1] Even though racial/ethnic disparities in access to care, unmet need, and continuous care were greatly reduced among SCHIP enrollees, racial/ethnic disparities among U.S. children remain.[2] In 2011-2012, uninsurance among Hispanic children is 2.5 times greater than non-Hispanic white children; and parental report of children being in fair/poor health is about 3 times more prevalent among minority children (Hispanic & non-Hispanic black) than non-Hispanic white children.[21]

Addressing these existing disparities early in childhood is highly important because the effects persist throughout the lifecourse.[10] Poor health in childhood has been associated with low educational attainment, substantially diminished labor market earnings, and poor health in adulthood.[22] These individual consequences can lead to a less productive workforce and higher health care costs overall.[10,22] Therefore, minority children who experience these disparities also experience increased likelihood to continue to be disadvantaged in a host of ways through adulthood, and ultimately to require more social and financial assistance. Thus, understanding where racial/ethnic disparities exist among U.S. children and how best to address the disparities early in life have far-reaching and critical impacts.

To address this research gap, this proposed research will use the Massachusetts (MA) health reform in 2006, and the ACA's insurance expansion efforts in 2014, to evaluate whether insurance expansion might reduce racial/ethnic disparities in health and health care for children 0-17 years old and their families. The dissertation's three aims are:

AIM 1. To examine long-term effects of the MA health reform on disparities in insurance access, utilization of care, and health status among Hispanic children compared to non-Hispanic white children.

AIM 2. To examine the short-term effects of the ACA on disparities in insurance access for and utilization of health care among Hispanic children compared to non-Hispanic white children.

AIM 3. To examine the short-term effects of the ACA on disparities in family financial burden due to medical costs among Hispanic children compared to non-Hispanic white children.

The impacts on disparities over time will be evaluated using a triple-difference (difference-in-difference-in-difference, or DDD) analysis, which simulates an experimental design with observational data (a quasi-experimental design). These findings will be the first to look at the ACA's impact on child disparities and to compare the impact with that of the MA health reform, which will be important contributions to the working body of knowledge of the effects of health insurance policies on child health and related disparities.

If there is evidence that health reform improved (narrowed) racial/ethnic disparities among children and improved family financial burden, the study could be used to support the health insurance reform policies. However, improved disparities may simply reflect poorer health care outcomes among NH-white children and families, and therefore, may not translate to better health care outcomes for Hispanic children and families. Alternatively, outcomes may improve for all children and families; therefore, the racial/ethnic disparities might remain. This study may provide important information for the health care community, child and family health advocates, and policymakers to better inform health policy and develop targeted interventions to ultimately reduce and eliminate racial/ethnic disparities explored in these study aims.

II. Significance and Innovation

This study is highly significant. The impacts of health reforms on health care disparities among children have not been well evaluated, particularly for the MA and ACA health reforms. To date, two studies have examined the overall effects of the Massachusetts (MA) health reform among children.[23,24] Yet, neither study included a subgroup analysis to evaluate changes in racial/ethnic disparities due to health reform on health status or utilization of care. One study found that the MA health reform had a significant impact on reducing disparities in consistent

health insurance coverage between children in households <300% of the FPL and children in households at or above 300% FPL. It also did not find significant improvements in income-related disparities for the same preventive care and health status measures.[25]

For the Affordable Care Act, studies have either conducted descriptive analysis to show differences in uninsurance among children by race/ethnicity,[8,26,27] evaluated children as a whole and not disparities between subgroups,[28,29] or primarily focused on disparities on non-elderly adults or the population as a whole.[30–32] One study used logistic regression to examine whether there have been changes in insurance coverage and health care utilization among children and found differences by racial/ethnic groups.[33] This study found that Latino children had the largest absolute gains in insurance, but continue to lag behind all other racial/ethnic groups. [33]

To analyze the impact of both reforms, this study also utilizes a quasi-experimental design. Evaluating effects of the ACA, which was enacted nationally, on racial/ethnic-related disparities among children, is a challenge since it is difficult to identify a comparison group without the policy; however, expansion of insurance had specific eligibility criteria. Those who did not qualify for Medicaid/CHIP prior to the ACA and who had a family income <400% of the Federal Poverty Level (FPL) are the group most inclined to benefit from insurance expansion efforts from the ACA. Using data from the first two years after the ACA enactment in 2014 and 2015, this study will not only evaluate changes in racial/ethnic-related disparities over time, but also employ a study design with two comparison groups to "tease out" the net impact of the ACA on racial/ethnic-related health disparities among children. To evaluate the MA health reform, existing studies have used a quasi-experimental design, such as a difference-in-difference analysis, which only includes controls for state and year effects. However, it does not

capture whether the MA health reform differentially impacted population subgroups, and more specifically, disparities between Hispanic and NH-white children.

The Hispanic population is now the largest minority group in the U.S., and they experience unique barriers to care compared to the NH-white population.[34] In 2010 there were 6.1 million Hispanic children living in poverty, and 4.1 million of them had immigrant parents.[34] In 2007, before the ACA was enacted, 66% of Hispanic children in the U.S. were first (foreign-born child and parent) or second generation (U.S. born child with foreign-born parent) immigrant Hispanic children, of which 58% and 16%, respectively, were uninsured. In comparison, 6% of non-Hispanic white children were uninsured.[35] Given the large proportion of immigrant children among Hispanics, families face other significant obstacles to healthcare access such as health literacy, and the lack of translation services and cultural sensitivity in the health care setting.[11,12,34] Hispanic children have the most to gain from insurance reform, and studies that focus on this subgroup and its unique challenges are vital in reducing health and healthcare disparities.

An innovative and important contribution to the field of disparities research is the use of an econometric approach to evaluate disparities in this study. This study will use a triple-difference (DDD) analysis, which has two advantages: 1) addressing any unmeasured or unknown confounding, and 2) eliminating the problem of person-level characteristics correlated with the predisposition of having insurance (endogenous treatment selection).[9,36] The benefits of a DDD design hold, however, under certain assumptions: 1) if the policy was not implemented in the intervention group, it would have the same trend as the control (parallel trends assumption), and 2) any event/policies that occur during the timeframe of the intervention will impact both

intervention and comparison group the same (common shock assumption). If any of these assumptions are violated, the effect can be over- or under- estimated.

Existing studies have used linear regression models for binary data, which can produce biased results and are not appropriate for very common or rare outcome variables of interest (i.e. insurance coverage), making linear approximations particularly unappealing.[23,24] However, non-linear models are difficult to interpret using this approach;[37] therefore, recycled predictions were used to produce adjusted percent and standard error estimates. In summary, a more sound analytical approach to evaluate health disparities, and new research on the ACA, will give us a better understanding of how health reform might impact minority children and family financial burden, and whether the reform has any effect on reducing racial/ethnic disparities on healthcare access, utilization, and family financial burden.

III. Dissertation Framework

To determine the impact of health reform on racial/ethnic-related disparities in health and health care, each study aim will use a retrospective nonequivalent comparison group design (a quasi-experimental design) with a pretest/posttest outcome measures and a control group.[38] The two interventions are the MA health reform and the ACA.

Each study aim employs secondary data analysis of longitudinal cross-sectional national and state-level annual surveys conducted by the National Center for Health Statistics (NCHS): the National Survey of Children's Health and the National Health Interview Survey. Each survey involves a detailed interview conducted with an adult who knows about the health and health care of one child randomly selected from the household.[39,40] The unit of analysis for each study aim is the child ages 0-17 years old. Racial/ethnic-related health disparities are evaluated

between Hispanic and non-Hispanic (NH) white children. Comparability between selected measures before and after reform was evaluated to ensure that each measure was derived from questions asked in the same way. The health and health care data on children in this study consist entirely of survey responses reported by a proxy respondent. The outcome measures examined in each aim are binary variables, which were selected using the following conceptual model.

The conceptual model, in Figure 1, which is an adaptation of the Myer's Bio-psychosocial model (Myers, 2009), highlights the independent variable of interest: race/ethnicity, a key determinant of health. Race/ethnicity is a proxy measure for a person's culture, origin, and phenotypic traits. For instance, different racial/ethnic groups may have similar or shared experiences and traits such as language, survived and/or sustained adversities from a country of origin, historical hardships, religion and socio-political beliefs.[41,42] The red lines in Figure 1 highlight direct pathways from race/ethnicity to various factors that affect the child throughout the lifecourse including: cognitive processing and emotional regulation, which is how individuals react to SES and racial/ethnic stressors; psychological reserve capacity, which is the a person's ability to mediate adverse risks; biological vulnerabilities and resistances; health behaviors such as diet, exercise, and how parents engage their child in the health care system; and the quality of health care, including treatment and services, that the child receives.

Specific to the race/ethnicity pathway is cognitive/emotional processing and emotional regulation. One systematic literature review by Williams and colleagues, which included six studies focused on children and adolescents, showed that perceived discrimination had a positive association with the diagnosis of major depression and other mental health problems such as anxiety disorder, addiction, psychosis, and anger.[43] However, cognitive-emotional processing

can vary by individuals based on their psychological reserve capacity for coping with these difficulties.[44]

Other factors that affect health include the family's resources, which include their socio-economic status (SES). Resources can impact various factors that are important in the child's lifecourse including: psychological reserve capacity, health behaviors, biological vulnerabilities such as genetic predispositions; biological stress response including allostatic load (the accumulation of stress throughout the lifecourse); and monetary factors that determine access to care such as having health insurance, availability of services, quality and cost of care.

Race/ethnicity can interact with the family's resources (and SES) to impact various factors that influence the health and well-being of children. For instance, children with lower SES and who have a minority backgrounds are more likely to experience psychosocial adversities, such as daily stress and adverse life events, that affect health outcomes from childhood into adulthood.[44,45] Resources that create reserve capacity are also based on race/ethnicity and SES such as tangible factors (i.e. income, child care, nutritious food), inter- (i.e. supportive relationships) and intra-personal characteristics (i.e. positive loci of control, optimism), socio-cultural factors (i.e. family orientation, ethnic cohesion, religiosity), and access to high quality health care. [44] The presence of resources can buffer the adverse effects of life stressors associated with low SES and race/ethnicity. It has been theorized that one of the reasons immigrant women have comparable pregnancy outcomes to NH-white women are socio-cultural factors that are protective over life stressors associated with lower SES.[46]

A child and family's race/ethnicity, resources, and the way they cognitively/emotionally process adverse experiences influence health behaviors and the quality of health care the child receives. A number of risky health behaviors such as smoking, substance abuse, poor diet, and

physical inactivity are present to a greater degree in persons of poor and minority backgrounds.[44] This can vary, however, by generational status. First generation Hispanics are less likely to be overweight/ obese and have lower rates of tobacco use compared to second generation immigrants and non-immigrant Hispanics, as well as NH-whites.[34,47] Cultural values can buffer the effects of adverse experiences such as family cohesion among Hispanics, as a source of emotional support.[34,48] Racial/ethnic minorities also receive lower quality of health care compared to non-Hispanic whites, which is not explained by differences in patient preferences, SES, or care-seeking behaviors.[11,46] This could reflect external factors such as differential allocation of resources that is engrained or institutionalized in the health care system.[46]

There are other external factors that influence access to care, such as policy intervention (i.e. MA health reform and ACA), which directly impact access to health insurance coverage. Naturally, one would assume that having health insurance would allow access to needed care and thus improve health. There is evidence that expanding insurance accessibility and/or implementing an insurance coverage mandate does increase insurance coverage among children.[1,23,49] There is also strong evidence that supports the increased use of services when the burdens of health care costs are ameliorated with health insurance.[16,18,20,50,51]

How insurance access and use of services translate into improved health outcomes involves indirect pathways. For instance, once a child accesses services, factors related to their SES could limit a child to accessing low-performing clinics, or race/ethnicity could influence the quality of care that they receive due to stereotypes or prejudices.[11,46,52,53] Poor quality of care and language barriers can also lead to less access to services and lack of adherence to treatments, and consequently poor health.[12,54] Consistent insurance coverage increases the potential to have continuous care with a health care provider, which translates to greater trust and positive

experiences,[54] increased use of preventive services,[1,20,55] fewer medical errors,[17] and better patient adherence to medications/health behaviors,[54] which theoretically translate to better health outcomes.[1,56,57]

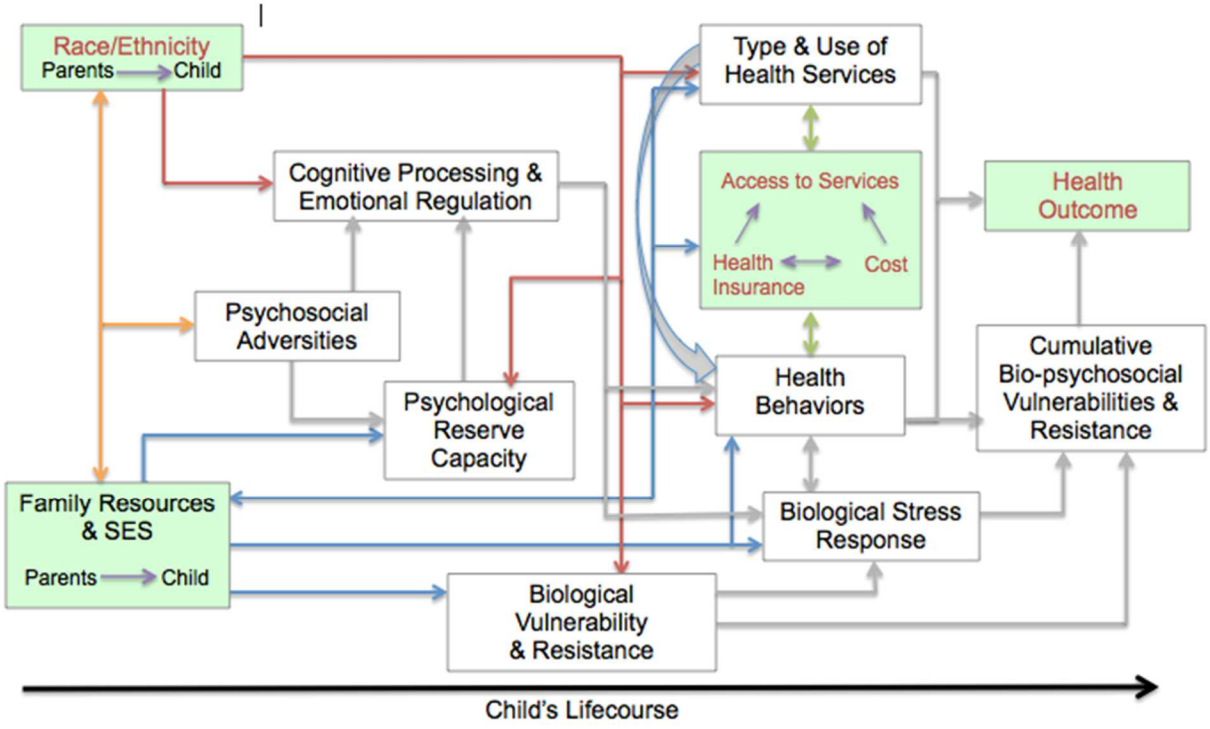
Without insurance coverage, having health care needs that require additional medical services and treatments can translate into significant financial burdens for the child's family (i.e., out-of-pocket costs). Health reform expands coverage, thus mitigating financial barriers faced when utilizing health care.[19] The links between insurance and health outcomes are very complex and influenced by other unobservable factors (e.g. beliefs, culture, etc.) or characteristics not captured in the data.[9] All these factors have implications for health outcomes over the child's lifecourse.

In summary, there are many pathways that impact whether children have access and utilize care, which can all have an effect on the child's health. A complex web of child, family and environmental factors (i.e., genetic predisposition, language, environmental pollutants, stress and others) can be barriers to access and use of health care, which may influence the health and well-being of children. Despite having insurance expansion through health reform, some social factors will continue to be barriers to care (such as ineligibility for public insurance due to citizenship status), which may affect the potential impact of these health care reforms. Given the study's non-randomized design, controlling for other determinants in the conceptual model will control for observed differences in child and family characteristics between the intervention and comparison groups and reduce threats to internal validity. However, it is still important to not adjust out the disparities between Hispanic and NH-white children within each treatment group in the analysis as well, which is why the following study will conduct two adjustments: one by sex and age, and another that includes additional socio-economic and demographic factors.

The three chapters that follow address each aim of the study, and the final chapter provides a discussion of the study findings, as a whole, including policy implications.

Tables and Figures

Figure 1. Direct and Indirect Pathways that Race/Ethnicity Influence Health and Healthcare Over the Lifecourse



Note: Orange lines highlight the interaction between race/ethnicity and socio-economic status (SES); red lines indicate direct pathways from Race/Ethnicity; blue lines indicate direct pathways from SES; green lines are direct pathways from Access to Service/ Cost/ Insurance factors, and grey lines are indirect pathways.

Chapter 2

Does health insurance reform narrow children's health disparities? Evidence from Massachusetts

Introduction

In 2006 the Massachusetts health care reform was enacted, expanding health insurance coverage to all legally residing Massachusetts (MA) residents.[58] The new expansion had a significant impact on access to insurance and health care services for adults[58], but only two studies have evaluated the impact of expanding insurance coverage for children through the MA Health Reform, and no literature addresses whether it impacted health disparities between racial-ethnic subgroups such as Hispanic and non-Hispanic (NH) white children.

Historically, we know that expanding health insurance eligibility has been successful at increasing health care insurance coverage among children. There was robust evidence supporting improved health insurance coverage for children through Medicaid expansion in the late 1980s, early 1990s, and the creation of the State Children's Health Insurance Program in 1997.[1] Uninsurance among children decreased from 13.9% in 1997 to 6.5% in 2013.[59]

There was some evidence that insurance coverage also has subsequent effects on children's health care utilization and health. The RAND Health Insurance Experiment (HIE), which randomized participants into health plans of various cost-sharing levels, found that decreased cost-sharing increased preventive care use among children.[9,18] Child admissions to hospitals were not influenced by cost-sharing.[18,50] A quasi-experimental study conducted by Currie and Gruber found that expanding Medicaid to children and pregnant women improved

both infant and child mortality rates.[60,61] None of these studies evaluated the subsequent effects on subgroups of children.

Despite the historical efforts to improve children's health insurance coverage, racial-ethnic related health disparities remain. Prior to enacting the Affordable Care Act (ACA), Hispanic children compared to NH-white children were more likely to be uninsured (9.7% vs. 3.5%, respectively), to have no preventive care visit in the past year (19.3% vs. 13.6%) and to have fair/poor health (6.1 vs. 1.7).[62,63] Hispanic families, especially limited English proficiency families who are more likely to be recent immigrants, face unique insurance access and healthcare barriers compared to other racial/ethnic groups.[64] Therefore, the need to evaluate whether expanding insurance has any effect on Hispanic children compared to NH-white children continues to be an important research priority. This includes evaluating downstream factors such as utilization of care and health status.

Our aim was to use the Massachusetts reform as a natural experiment to evaluate the impacts of the 2006 MA health insurance expansion on disparities in health insurance coverage, preventive care utilization, and health outcomes among Hispanic and NH-white children.

The Massachusetts Health Care Reform

The Massachusetts (MA) health reform, the model on which the ACA was based on, established laws to protect legal residents with pre-existing conditions, a ceiling for out-of-pocket costs, a mandate that individuals have health insurance or pay a penalty, and improved access to health insurance coverage through Medicaid/SCHIP expansion or a health exchange website, the Commonwealth Health Insurance Connector.[58] Through the Connector, families can access sliding-scale subsidized insurance plans for households up to 300% of the Federal Poverty

Level (FPL), and fully subsidized plans for those less than 150% FPL. Medicaid was expanded up to 133% FPL for parents, up to 200% FPL for pregnant women, and Medicaid and SCHIP were expanded up to 300% FPL for children. Penalties for being uninsured were exempt for households up to 150% FPL.[58]

In Massachusetts, the proportion of uninsurance among children was reduced by more than half (4.6% pre-reform, 1.8% post-reform) by enacting comprehensive health reform in 2006.[24] Miller (2012) reported that the MA health reform had a significant improvement on parental reports of overall health and preventive care utilization, and decreased emergency room visits among children,[23] whereas Smith & Chien (2014) found the measures did not improve among Children with Special Health Care Needs (CSHCN).[49] The effects of the MA Health reform among all children compared to CSHCN were mixed, which highlights the importance of studying the effects of policies on population subgroups.

Methods

Data Source. The data for the study come from the National Survey of Children's Health (NSCH), a random-digit dial telephone survey, which aims to derive national and state level population-based estimates of the health and well-being of children in the U.S. The NSCH was a cross-sectional survey sponsored by the Maternal and Child Health Bureau and conducted by the National Center for Health Statistics (NCHS). Data from the NSCH were first collected in January 2003 - July 2004, and the latest iteration was collected in February 2011 - June 2012. One child was randomly selected from each household, and a detailed interview was conducted with an adult (18 years or older) who knew about the health and health care of the child.[40]

Study Design and Sample. We employed a nonequivalent comparison group design composed of Hispanic and NH-white NSCH children ages 0 to 17 years old living in Massachusetts (intervention group) and Connecticut, Rhode Island, and New Hampshire (control group), which had the most similar socioeconomic child-level characteristics to MA among New England states.[38]

Measures. Race/ethnicity was operationalized through parental self-report using two questions: the child's race and the child's Hispanic, Latino or Spanish origin. Disparities between Hispanic and NH-white children were examined for selected outcome variables. Table 1 presents three health and well-being domains composed of seven outcome variables. Other descriptive variables used in this study include the child's age, sex, the number of adults and children living in their home, family income, and primary language spoken in the home. The measures were parent reported and were comparable between the 2003/2004 and 2011/2012 iteration of the NSCH.[63]

Health reform should have a direct impact on insurance domain measures (Table 1), and preventive care would theoretically improve in light of better access to insurance coverage. Improved insurance coverage and preventive care, in turn, may lead to improved health among children. Hypothetically, if utilization increases due to reform, the diagnosis of conditions that might otherwise go under-diagnosed could increase. Therefore, CSHCN status, defined as children who have "a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally," was included as a health measure.[65,66]

Analytic Approach. One challenge in estimating health insurance effects is that the same factors usually determine whether a person has insurance and a person's health.[9] The challenge

was addressed when health insurance varies due to an external event, such as the MA health reform, a policy change that was not influenced by unobservable individual characteristics that also determine health.

We conducted a difference-in-difference-in-difference (DDD) multivariable regression analysis to estimate the effects of MA reforms on racial/ethnic disparities.[36] A DDD analysis estimates the change in health disparities over time for the experimental group, subtracted from the change in disparities over time for the control group. In other words, the DDD estimation controls for policies and historical events that occurred independent of the MA health reform over the study's time frame that can have an effect on health outcomes (e.g., new pharmaceutical drugs or medical technology, an economic downturn). However, for the results of a DDD analysis to be valid, we assume that the change in racial/ethnic-related disparities in the control group follows the same trend in the intervention group (MA) if the health reform had never occurred (parallel trends assumption).

In the DDD analysis, for each individual child *i* by state *j* at time *t*, the following regression model was estimated:

$$Pr(Y_{ijt}|Xs)=\beta_0 + \beta_1 X_{ijt} + \beta_2[yr_t] + \beta_3[state_j] + \beta_4[ethnicity_i] + \beta_5[state_j \times yr_t] + \beta_6[yr_t \times ethnicity_i] + \beta_7[state_j \times ethnicity_i] + \beta_8[state_j \times yr_t \times ethnicity_i]$$

where *X* indicated covariates, *state* was a dummy variable indicating whether the child lived in MA or a control state, *yr* was a dummy variable for whether an observation occurred pre- or post-reform, and *ethnicity* was a dummy variable indicating whether the child was Hispanic/Latino(a) or NH-white. Goodness of fit (GOF) analyses were conducted to ensure proper fit using a non-linear model (either logistic, probit, or complementary log-log) to each

outcome variable. Recycled predictions were used to generate adjusted percent estimates from non-linear models. Statistical significance was derived for the adjusted estimates by producing 1000 bootstraps for each estimate. The DDD analysis first controlled for only sex and age and does not control for factors that influence disparities in health, since it would "adjust away" the effect being measured (racial/ethnic disparities).[67] The second round controlled for all covariates to deduce whether these factors explain the existing disparity and any changes observed over time. Estimates were weighted using the appropriate survey specific commands in STATA 14.

Missing Data. Less than 2% of the outcome variables and socio-demographic variables were missing. Approximately 8% of the respondents did not answer questions about family income; therefore, missing income values were produced with single imputations, using imputation files provided by NCHS.

Results

Table 2 shows that socioeconomic composition before and after health reform for Massachusetts and the control states. In the MA sample, there were 251 Hispanic and 1,613 NH-white children pre-reform, and 237 Hispanic and 1,294 NH-white children post-reform. In the control state sample, there were 734 Hispanic and 4,679 NH-white children pre-reform, and 711 Hispanic and 4,127 NH-white children post-reform. For the most part, the descriptive characteristics do not change differentially between Massachusetts and the control states over the study period. The results from the DDD analysis, adjusting for age and sex, are presented in Tables 3a for health insurance and preventive care and Table 3b for health status measures. Adjusting for all covariates yielded similar results.

Health Insurance. While there was a significant health insurance gap between Hispanic and NH-white children before the health reform in MA and Control states (-88% & -7.0%, respectively), this disparity was no longer significant in MA post-reform, but remained significant in the control states (Table 3a). Although the disparity changed over time in MA from -8.8% to -0.2%, in other words, narrowed by 8.5-percentage points (p=0.002), no significant impact from health reform could be detected (DDD=4.8%-points, p=0.181). Nevertheless, the MA health reform did have a substantial impact on consistent health insurance coverage on children by narrowing the racial/ethnic-related disparity by almost 11-percentage points (p=0.043). Despite the improvement, a 6-percentage point disparity in consistent health coverage (p=0.025) remains between Hispanic & NH-white children in MA post-reform.

When adjusting for other socio-economic and demographic factors, the overall impact of health reform on racial/ethnic-related disparities for having current and consistent health insurance coverage were similar. However, consistent insurance coverage disparities between Hispanic and NH-white children were no longer significant in MA post-reform after adjusting for other socio-economic and demographic factors (p=0.2890).

Preventive Care. The MA health reform did not have a significant impact on preventive care (Table 3a). The racial/ethnic-related disparity for having a personal doctor or nurse significantly improved post-reform for both treatment groups by 9.6 (p=0.021) and 7.5 (p=0.017) percentage points, respectively. Since the disparity improvement was similar for MA and the control states, it reflects a regional trend and not a significant impact from the MA health reform (DDD=2.1%, p=0.697). No change in preventive medical visits were detected in MA & control states. For both preventive care measures, significant racial/ethnic related disparities persist in

both treatment groups. Similar results were found when adjusting for other socio-economic factors.

Health Status. In both treatment groups, parents of Hispanic children were less likely to report that the child's health was excellent/very good than NH-white children both pre- and post-reform (Table 3b). However, among Hispanic children, the proportion of parents who reported excellent/very good health increased post-reform in MA, which led to a 7-percentage point reduction in the disparity. In contrast, the disparity in control states narrowed by only 1.6-percentage points. Despite a greater reduction in MA versus the control states, the result was not statistically significant due to the large standard errors.

For children who had SHCN, there were no disparities between Hispanic and NH-white children pre- and post-reform, and therefore, no significant impact from the MA health reform (Table 3b). The estimates adjusted for socio-economic and demographic factors did not differ from the overall health and CSHCN findings (Appendix Table 4b).

In MA, disparities for children with multiple school absences (≥10 days) improved by 8.4-percentage points, and were no longer significant post-reform ($p=0.158$); whereas the control states did not have significant and similar disparities pre- or post-reform. Health reform narrowed racial-ethnic related disparity in MA by 7 percentage-points, which was significant at the $\alpha=0.1$ level. After adjusting for socio-economic and demographic factors, the overall impact of reform was no longer significant ($p=0.169$).

Health reform had no significant impact on racial-ethnic related disparities for having no school absences. Although Hispanic parents are less likely to report excellent/very good overall health than NH-white children, Hispanic children are more likely to have no school absences than NH-white children in MA and control states. Furthermore, differences in school absences

between Hispanic and NH-white children did not change pre- to post-reform in MA, despite improved overall health among Hispanic children. The results were similar in the fully adjusted models.

Discussion

The disparity in insurance coverage narrowed by 8.5 percentage-points in MA from 2003/2004 to 2011/2012, compared to 3.7 percentage points in the control states. Insurance coverage disparities were no longer significant between Hispanic and NH-white children in 2011/2012, whereas they continued to be significant in the control states. However, there was insufficient power to determine whether the MA health reform narrowed insurance coverage disparities, which was evident by the large standard errors produced when testing disparities pre- vs. post-reform.

The MA health reform had a significant impact on improving insurance continuity throughout the year for Hispanic children and narrowing gaps between NH-white and Hispanic children, but the disparity remained significant post-reform. The post-reform disparity was primarily driven by differences in socio-economic and demographic factors between Hispanic and NH-white children. Although we could not determine significant impacts on health status outcomes, subsequent effects of improved health outcomes due to continuous health care coverage over a longer period of time are possible, but could not be addressed in this study.

Similar findings were noted in a study that examined income-related disparities, where the MA health reform had a significant impact on reducing disparities in consistent health insurance coverage between children in households <300% of the FPL and children households

at or above 300% FPL. It also did not find significant improvements in income-related disparities for the same preventive care and health status measures at the α=0.05 level.[25]

Increased coverage for parents through the Massachusetts health reform, although not addressed in the current study, might explain improved continuity of care for their children. The Oregon health insurance experiment, a Medicaid expansion study that used a lottery to randomize non-elderly adults, found that having newly insured parents who obtained Medicaid doubled the odds of having insurance coverage for their children compared to children whose parents were not selected to apply for Medicaid.[20]

Enrollment through the Massachusetts Health Connector, which provided subsidized private insurance coverage, could have improved continuity of care. Some children who were at the upper income eligibility threshold for Medicaid ("MassHealth") move back and forth as eligible or ineligible when their parent's income fluctuates over time. Miller found a significant increase in private insurance coverage due to health reform among children in MA overall, and a decrease in non-comprehensive insurance coverage.[23] Thus, as parents complied with the individual mandate, enrollment in private insurance could have picked up children that churn in and out of insurance coverage and children without comprehensive insurance coverage.

Continuity of care could have also improved from outreach efforts through the MA health reform that brought families into the Massachusetts Health Connector and linked them to Medicaid/SCHIP enrollment for their children. Dubay and colleagues have described this as a "spillover effect:" simplification of enrollment and outreach efforts during SCHIP implementation not only brought children into the CHIP program, but also spilled over into increased Medicaid enrollments as well.[68]

Implications of Results. This study highlights the importance of evaluating how disparities are affected by health policies, and the significant limitations in conducting disparities research. Evaluating population average estimates using the NSCH at the state-level has enough power to detect improved outcomes for children overall.[23] In contrast, notable reductions in racial/ethnic-related disparities, for insurance and most health status measures were in the direction of improvement, but did not translate into significant findings primarily due to insufficient power as evident from the large standard errors generated for the second and third predicted differences. Even with low power, this paper contributes to the sparse literature on the impact that the MA health reform had on disparities in consistent insurance coverage. We also found significant reductions in disparities over time for having current insurance coverage, having a personal doctor or nurse, and in disparities for having multiple school absences in MA alone.

When interpreting these findings, a couple factors should be considered. First, the impact of the MA health reform may be underestimated from the study being underpowered. Non-significant findings may be significant if larger sample sizes for Hispanic/Latino children were available, which underlines the importance and need for state-level data with enough power to properly evaluate the impact of policy changes on subgroups of children. Other surveys, such as the National Health Interview Survey, were also considered for this analysis; however, sample size by state was a greater limitation. Consideration should also be given to the socio-demographic and economic composition of MA and northeastern control states, which can also be quite different from other U.S. states. Therefore these estimates cannot be completely generalizable to any other state or the U.S. as a whole, nor can they be generalizable to disparities between NH-white and other minority groups.

In addition, the NSCH does not ask for citizenship status, therefore we could not control for this factor. The individual mandates and insurance coverage opportunities instituted by the MA health reform did not apply to undocumented immigrant families. This problem was likely to affect Hispanic/Latino communities more so than NH-white communities, therefore primary language was used as a proxy variable. Adjusting for socio-economic and demographic factors did adjust away some disparities, but we did not test to what extent primary language was contributing to the disparity.

Conclusion

Despite these challenges, we conclude that the MA health reform reduced racial/ethnic-related disparities and improved access to consistent insurance coverage for Hispanic children. We should not discount the potential long-term benefits of improved continuous coverage. Studies have found that as disruptions to insurance coverage increase, so does the likelihood of having unmet medical needs, less routine preventive care visits, and loss of a child's usual source of care.[69,70]

The 2006 MA health reform did improve continuity of insurance coverage for Hispanic/Latino children, however it did not eliminate the disparity. This study can serve as an important baseline of disparities estimates in MA as we continue to evaluate how disparities change (or do not change) over time. Quasi-experimental studies that evaluate the impact of the MA health reform, which was similar to that of the ACA, continue to be relevant today and important to inform policies that are state-specific or nationally sanctioned, especially given that the current political administration is set to embark on major health policy changes within the next few years.

Tables and Figures

Table 1. Healthcare and Well-being Domains and Outcome Variables

Domains	Outcome Variables
Health Insurance	*Whether a child had:* – Health insurance at time of interview – No gaps in (consistent) health insurance coverage in the past year
Preventive Care	*Children who had:* – A personal doctor or nurse (PDN) – One or more preventive care visits
Health	*Whether a child had:* – Excellent/very good overall health status (vs. fair/good/poor) – Special health care needs (CSHCN) [1] – Missed days of school (available only for children 6-17 years old)

[1] CSHCN status was derived from a five-item screening tool in the NSCH.

Note: Each health indicator is used in this analysis as binary variables.

Table 2. Unadjusted Percent Estimate of Descriptive Characteristics Before and After for Massachusetts and Control States, 2003-2004 and 2011-2012

Characteristics	Massachusetts					Control States					MA vs. Control	
	2003-2004		2011-2012		Chi-Sq	2003-2004		2011-2012		Chi-Sq	Chi-Sq P-value	
	(n=2,114)		(n=1,861)		p-value	(n=6,090)		(n=5,711)		p-value	03-'04	11-'12
	Percent (Standard Error Percent)											
Age Group												
0 to 5	31.7%	(1.20)	31.1%	(1.40)	0.4195	31.3%	(0.80)	29.7%	(0.90)	0.2661	0.9651	0.5266
6 to 11	33.8%	(1.20)	31.9%	(1.40)		34.1%	(0.80)	33.8%	(0.90)			
12 to 17	34.5%	(1.20)	36.9%	(1.50)		34.6%	(0.80)	36.5%	(1.00)			
Sex												
Female	48.8%	(1.30)	49.0%	(1.50)	0.921	49.0%	(0.90)	48.6%	(1.00)	0.7749	0.9342	0.8068
Male	51.2%	(1.30)	51.0%	(1.50)		51.0%	(0.90)	51.4%	(1.00)			
Race/Ethnicity												
NH-white	75.4%	(1.20)	65.2%	(1.50)	<0.001	75.9%	(0.80)	66.1%	(1.00)	<0.001	0.0953	0.0509
NH-black	6.8%	(0.80)	7.5%	(1.00)		7.4%	(0.60)	7.9%	(0.60)			
Hispanic/Latino	10.5%	(0.80)	14.9%	(1.20)		11.4%	(0.60)	16.8%	(0.90)			
NH-Other	7.4%	(0.80)	12.5%	(1.10)		5.3%	(0.40)	9.1%	(0.60)			
Total kids in household												
One	21.9%	(0.80)	25.8%	(1.20)	0.0121	21.9%	(0.60)	25.0%	(0.70)	0.0072	0.9437	0.6322
Two	41.9%	(1.20)	43.0%	(1.50)		42.2%	(0.80)	42.2%	(1.00)			
Three	36.2%	(1.40)	31.2%	(1.60)		35.8%	(0.90)	32.7%	(1.00)			
Total adults in household												
One	14.6%	(0.01)	13.5%	(0.01)	0.5395	14.4%	(0.01)	13.7%	(0.01)	0.1278	0.9652	0.8625
Two	69.1%	(0.01)	68.8%	(0.01)		69.3%	(0.01)	67.9%	(0.01)			
Three	16.3%	(0.01)	17.7%	(0.01)		16.4%	(0.01)	18.4%	(0.01)			
Family Income												
<100% FPL	11.8%	(1.00)	14.2%	(1.30)	0.0115	10.2%	(0.60)	14.2%	(0.80)	<0.001	0.177	0.4832
100%-<200% FPL	14.9%	(1.00)	15.1%	(1.20)		16.7%	(0.70)	16.8%	(0.80)			
200%-<400% FPL	33.0%	(1.20)	26.6%	(1.40)		34.2%	(0.80)	27.7%	(0.90)			
400% FPL/more	40.3%	(1.20)	44.1%	(1.50)		38.9%	(0.80)	41.4%	(1.00)			
Primary Language												
Non-English	9.8%	(0.80)	12.6%	(1.10)	0.0326	7.9%	(0.50)	12.8%	(0.80)	<0.001	0.0394	0.904
Metropolitan Statistical Area												
Large MSA	17.96%	(1.07)	22.32%	(1.37)	<0.001	19.95%	(0.73)	26.40%	(0.94)	<0.001	<0.001	<0.001
Small MSA	80.31%	(1.10)	76.99%	(1.38)		64.68%	(0.83)	60.69%	(1.00)			
Outside MSA	1.73%	(0.33)	0.68%	(0.28)		15.37%	(0.55)	12.91%	(0.65)			

Table 3a. Insurance and Preventive Care Measures Before and After Reform for Massachusetts (MA) and Control States, Adjusted by Sex and Age

Child Outcome Measures		Pre-Reform (2003/2004)				Post-Reform (2011/2012)				Change Over Time		Effect	
		Hispanic	NH-White	Disparity	p-value	Hispanic	NH-White	Disparity	p-value	[Disparity Pre – Post]	p-value	DDD	p-value
Health Insurance Measures													
Child Has Health Insurance													
MA	%	88.5%	97.3%	-8.8%	0.001	99.2%	99.4%	-0.2%	0.817	8.5%	0.002	4.8%	0.181
	(SE%)	(2.67)	(0.51)	(2.73)		(0.90)	(0.26)	(0.92)		(2.77)			
Control	%	89.8%	96.8%	-7.0%	<0.001	94.4%	97.7%	-3.3%	0.011	3.7%	0.073		
	(SE%)	(1.58)	(0.34)	(1.60)		(1.23)	(0.34)	(1.27)		(2.05)			
Child Has Consistent Health Insurance													
MA	%	74.3%	93.4%	-19.1%	<0.001	91.6%	97.5%	-6.0%	0.025	13.1%	0.003	10.7%	0.043
	(SE%)	(3.66)	(0.79)	(3.76)		(2.52)	(0.60)	(2.60)		(4.50)			
Control	%	83.2%	92.8%	-9.7%	<0.001	87.0%	94.3%	-7.3%	<0.001	2.4%	0.382		
	(SE%)	(1.92)	(0.50)	(1.96)		(1.91)	(0.56)	(2.00)		(2.74)			
Preventive Care Measures													
Child Has a Personal Doctor or Nurse													
MA	%	78.5%	94.3%	-15.8%	<0.001	91.1%	97.4%	-6.3%	0.018	9.6%	0.021	2.1%	0.697
	(SE%)	(3.22)	(0.64)	(3.23)		(2.52)	(0.65)	(2.59)		(4.15)			
Control	%	77.4%	93.8%	-16.4%	<0.001	88.3%	97.2%	-8.9%	<0.001	7.5%	0.017		
	(SE%)	(2.29)	(0.43)	(2.35)		(2.04)	(0.40)	(3.13)		(3.13)			
Child Had 1 or More Preventive Medical Visit													
MA	%	81.8%	94.6%	-12.8%	<0.001	85.2%	94.6%	-9.4%	0.004	3.4%	0.437	0.6%	0.909
	(SE%)	(2.92)	(0.68)	(3.00)		(3.23)	(0.86)	(3.35)		(4.56)			
Control	%	80.7%	90.4%	-9.7%	<0.001	85.7%	92.6%	-6.9%	0.001	2.8%	0.345		
	(SE%)	(2.14)	(0.56)	(2.20)		(2.05)	(0.65)	(2.14)		(3.09)			

Note: Standard errors and p-values were generated using the bootstrap method.
Abbreviations: Disparity = (Hispanic) – (NH-White); DDD = difference-in-difference-in-difference

Table 3b. Child Health Measures Before and After Reform for Massachusetts (MA) and Control States, Adjusted by Sex and Age

Child Outcome Measures		Before Reform				After Reform				Change Over Time		Effect	
		Hispanic	NH-White	Disparity	p-value	Hispanic	NH-White	Disparity	p-value	[Disparity pre –post]	p-value	DDD	p-value
Health Status Measures													
Overall Health is Excellent/Very Good													
MA	%	68.4%	92.6%	-24.2%	<0.001	75.8%	93.0%	-17.1%	<0.001	7.0%	0.198	5.4%	0.415
	(SE%)	(3.70)	(0.82)	(3.75)		(3.95)	(0.99)	(4.07)		(5.53)			
Control	%	68.4%	92.1%	-23.7%	<0.001	70.4%	92.5%	-22.1%	<0.001	1.6%	0.661		
	(SE%)	(2.58)	(0.53)	(2.66)		(2.73)	(0.66)	(2.81)		(3.78)			
Child Has Special Health Care Needs													
MA	%	24.1%	23.2%	1.0%	0.779	24.0%	22.8%	1.2%	0.776	0.3%	0.963	-2.5%	0.693
	(SE%)	(3.41)	(1.24)	(3.58)		(3.94)	(1.44)	(4.21)		(5.65)			
Control	%	17.5%	19.6%	-2.1%	0.314	20.7%	20.0%	0.7%	0.779	2.8%	0.384		
	(SE%)	(2.0)	(0.72)	(2.14)		(2.39)	(0.88)	(2.53)		(3.21)			
Child Has ≥10 School Absences (ages 6-17 years)													
MA	%	10.2%	2.4%	5.6%	0.063	2.4%	5.2%	-2.8%	0.158	-8.4%	0.018	-7.0%	0.101
	(SE)	(2.96)	(1.83)	(3.01)		(1.83)	(0.86)	(1.97)		(3.54)			
Control	%	7.1%	4.7%	2.3%	0.133	6.8%	5.8%	1.0%	0.597	-1.3%	0.583		
	(SE)	(1.51)	(0.49)	(1.56)		(1.78)	(0.65)	(1.87)		(2.45)			
Has No School Absences (ages 6-17 years)													
MA	%	29.6%	11.2%	18.4%	<0.001	27.5%	10.9%	16.6%	0.002	-1.7%	0.811	-10.5%	0.223
	(SE)	(4.39)	(1.06)	(4.45)		(5.07)	(1.31)	(5.27)		(7.24)			
Control	%	24.0%	14.9%	9.1%	0.001	30.4%	12.5%	17.9%	<0.001	8.8%	0.051		
	(SE)	(2.79)	(0.87)	(2.85)		(3.41)	(0.84)	(3.50)		(4.48)			

Note: Standard errors and p-values were generated using the bootstrap method.
Abbreviations: Disparity = (Hispanic) – (NH-White); DDD = difference-in-difference-in-difference

Table 4a. Insurance and Preventive Care Measures Before and After Reform for Massachusetts (MA) and Control States, Adjusted by Socio-economic and Demographic Characteristics

Child Outcome Measures		Pre-Reform (2003/2004)				Post-Reform (2011/2012)				Change Over Time		Effect	
		Hispanic	NH-White	Disparity	p-value	Hispanic	NH-White	Disparity	p-value	|Disparity Pre – Post|	p-value	DDD	p-value
Health Insurance Measures													
Child Has Health Insurance													
MA	%	92.3%	96.2%	-3.90%	0.0890	99.6%	98.9%	0.75%	0.2380	4.7%	0.0450	2.5%	0.3620
	(SE%)	(2.19)	(0.71)	(2.29)		(0.46)	(0.43)	(0.64)		(2.32)			
Control	%	93.4%	95.6%	-2.2%	0.1920	96.8%	96.9%	0.0%	0.9830	2.2%	0.1910		
	(SE%)	(1.53)	(0.48)	(1.70)		(0.99)	(0.49)	(1.15)		(1.68)			
Child Has Consistent Health Insurance													
MA	%	77.6%	91.4%	-13.9%	<0.001	93.6%	96.0%	-2.4%	0.2890	11.5%	0.0050	9.9%	0.0340
	(SE%)	(3.54)	(0.95)	(3.67)		(2.07)	(0.85)	(2.24%)		(4.10)			
Control	%	86.7%	90.6%	-3.9%	0.0890	90.2%	92.5%	-2.3%	0.2120	1.6%	0.5180		
	(SE%)	(2.08)	(0.66)	(2.27)		(1.65)	(0.71)	(1.84)		(2.44)			
Preventive Care Measures													
Child Has a Personal Doctor or Nurse													
MA	%	83.2%	92.4%	-9.2%	0.0040	96.2%	96.1%	0.1%	0.9420	9.3%	0.0080	4.5%	0.3010
	(SE%)	(3.12)	(0.87)	(3.18)		(1.31)	(0.87)	(1.54)		(3.52)			
Control	%	84.3%	91.7%	-7.3%	0.0030	93.3%	95.8%	-2.5%	0.1310	4.8%	0.0760		
	(SE%)	(2.30%)	(0.61)	(2.45)		(1.53)	(0.55)	(1.69)		(2.70)			
Child Had 1 or More Preventive Medical Visit													
MA	%	86.4%	93.4%	-7.0%	0.0090	90.4%	93.0%	-2.6%	0.3740	4.42236%	0.2460	2.0%	0.6660
	(SE%)	(2.58)	(0.83)	(2.66)		(2.68517)	(1.06)	(2.89)		(3.81)			
Control	%	85.2%	88.9%	-3.7%	0.1020	89.6%	90.9%	-1.3%	0.5100	2.4%	0.3490		
	(SE%)	(2.10%)	(0.69)	(2.29)		(1.74)	(0.80)	(1.99)		(2.60)			

Note: Standard errors and p-values were generated using the bootstrap method.
Abbreviations: Disparity = (Hispanic) – (NH-White); DDD = difference-in-difference-in-difference

Table 4b. Child Health Measures Before and After Reform for Massachusetts (MA) and Control States, Adjusted by Socio-economic and Demographic Characteristics

Child Outcome Measures		Before Reform				After Reform				Change Over Time		Effect	
		Hispanic	NH-White	Disparity	p-value	Hispanic	NH-White	Disparity	p-value	[Disparity Pre –Post]	p-value	DDD	p-value
Health Status Measures													
Overall Health is Excellent/Very Good													
MA	%	82.8%	90.5%	-7.8%	0.0840	88.4%	90.9%	-2.6%	0.2960	5.2%	0.3000	3.4%	0.551
	(SE%)	(4.11)	(1.09)	(4.50)		(3.47)	(2.75)	(2.46)		(5.04)			
Control	%	81.6%	89.4%	-7.8%	0.0080	84.1%	90.1%	-6.0%	<0.001	1.8%	0.4960		
	(SE%)	(3.23)	(0.92)	(2.93)		(3.49)	(1.42)	(2.72)		(2.65)			
Child Has Special Health Care Needs													
MA	%	29.6%	24.2%	5.4%	0.2090	28.6%	23.9%	4.7%	0.3060	-0.7%	0.9150	-4.3%	0.569
	(SE%)	(4.11)	(1.47)	(4.31)		(4.32)	(1.65)	(4.63)		(6.39)			
Control	%	19.9%	20.2%	5.4%	0.2090	24.1%	20.8%	4.7%	0.3060	-0.7%	0.3480		
	(SE%)	(2.58)	(0.84)	(4.31)		(3.03)	(1.00)	(4.63)		(6.39)			
Child Has ≥10 School Absences (ages 6-17 years)													
MA	%	9.0%	10.2%	-1.1%	0.6630	5.0%	12.0%	-7.0%	<0.001	-5.9%	0.0140	1.9%	0.169
	(SE%)	(2.55)	(1.12)	(2.61)		(1.47)	(1.43)	(1.84)		(2.40)			
Control	%	13.5%	10.8%	2.7%	0.3210	8.5%	13.6%	-5.1%	0.0270	-7.8%	0.0100		
	(SE%)	(2.49)	(0.84%)	(2.74)		(2.05)	(1.07)	(2.30)		(3.03)			
Has No School Absences (ages 6-17 years)													
MA	%	24.0%	13.3%	10.6%	0.0180	22.8%	12.6%	10.1%	0.0440	-0.5%	0.9340	-10.0%	0.193
	(SE%)	(4.34)	(1.30)	(4.49)		(4.68)	(1.52)	(5.01%)		(6.33)			
Control	%	18.8%	17.1%	1.8%	0.5750	25.6%	14.4%	11.2%	0.0020	9.5%	0.0200		
	(SE%)	(2.85)	(0.99)	(3.13)		(3.41)	(1.08)	(3.62)		(4.08)			

Note: Standard errors and p-values were generated using the bootstrap method.
Abbreviations: Disparity = (Hispanic) – (NH-White); DDD = difference-in-difference-in-difference

Chapter 3

Did the ACA narrow health disparities between Hispanic and non-Hispanic white children? The impact of expanding insurance coverage on insurance and utilization of care measures.

Introduction

Numerous studies and systematic reviews have demonstrated considerable impact of U.S. public insurance programs on the well-being of children and youth throughout history.[1,56,71] Medicaid expansion in the late 1980s to early 1990s and the creation of the State Children's Health Insurance Program (CHIP) substantially increased health insurance coverage, improved access to care for children, and reduced mortality rates.[71] One study found that for every 10%-point increase in eligibility for Medicaid and/or CHIP coverage, there was a 3.7% decline in child mortality.[1]

At the same time, racial/ethnic disparities in health insurance coverage persist. In 2011/2012, prior to the expansion of insurance coverage through the Patient Protection and Affordable Care Act (ACA), Hispanic children, compared to non-Hispanic (NH)-white children, are more likely to be uninsured (9.7% vs. 3.5%, respectively), have no preventive care visit in the past year (19.3% vs. 13.6%), and have fair/poor overall health by parental report (6.1% vs. 1.7%).[63] Over the lifecourse, these disparities leave Hispanic children more disadvantaged than others since they face unique barriers to care compared to other racial/ethnic groups.[64] This is particularly true for children in limited English proficiency families who are more likely to be recent immigrants and face other significant obstacles to healthcare access such as health

literacy, and the lack of translation services and cultural sensitivity in the health care setting.[11,12,34] Poor health in childhood is associated with low educational attainment, substantially diminished labor market earnings, and poor health in adulthood.[22]

The 2010 Affordable Care Act provided new resources for uninsured U.S. families to access health insurance coverage. This policy change provides a new opportunity to evaluate how access to health insurance coverage impacts existing racial-ethnic health care disparities. Some ACA policy reforms, such as prohibiting health plan discrimination due to pre-existing conditions or gender and abiding by the "maintenance of effort" provisions,[72] were effective immediately upon ACA enactment. Key aspects of the ACA's insurance expansion efforts occurred in 2014 ("insurance expansion"), including implementation of the individual mandate, access to subsidized insurance through state and federal insurance marketplaces (healthcare.gov), and Medicaid expansion.[73,74] Some states, however, opted to not expand Medicaid and some implemented expanded Medicaid before 2014.[75]

Studies have shown improvements in health insurance access since the implementation of the ACA's 2014 health insurance expansion,[33,76] including declines in uninsurance among all ages to 9%, the lowest rate in U.S. history.[76] Among all children, Ortega and colleagues demonstrated significantly improved insurance access and well-child visits in the past year. [33] Among Hispanic children, the same study demonstrated significant improvements in well-child visit rates and experienced the largest reduction in uninsurance from 12% before insurance expansion (2011-2013) to 9% post-expansion (2014-2015); even still, disparities persisted post-expansion relative to Non-Hispanic (NH) white children.[33] Like many existing studies on the ACA, the study could not determine causality.

The current study adds to existing literature by evaluating whether expanding insurance through the ACA impacted health disparities between Hispanic and NH-white children. A quasi-experimental design was employed using the ACA's insurance expansion in 2014 as a policy intervention and identifying treatment groups based on Medicaid expansion and Health Insurance Marketplace income eligibility levels. Using this approach, we measured whether disparities for each outcome differed before and after expansion between treatment groups due to the policy intervention. Unlike prior studies that did not employ quasi-experimental designs, this analysis controlled for events that occurred independent of the insurance expansion over the study timeframe that could affect health care access and use (e.g., new pharmaceutical drugs or medical technology or an economic downturn).[38]

Methods

Data Source. The National Health Interview Survey (NHIS) is an in-person interview survey covering various health, health care, and health behavior topics, conducted by the National Center for Health Statistics (NCHS) on the civilian noninstitutionalized U.S. population. This study used NHIS data from 2005 to 2015 (Pre-expansion: 2005-2013; Post-expansion: 2014-2015).[77]

Sample. The NHIS selected child sample was used, where one child was randomly selected from each family, and a detailed interview was conducted with an adult (18 years or older) living in the household who knew about the health of the other family members living in the household. This study compared Hispanic and NH-white non-institutionalized children who were ages 0 to 17 years old (N=95,285).

Measures. Insurance and use of health care were captured with six outcome measures, each binary (yes/no) variables (Table 5). Other measures included in the study were socioeconomic and demographic characteristics (Table 6). Race/ethnicity was operationalized through questions about the child's race and the child's Hispanic, Latino(a) or Spanish origin. Question wording for each outcome and socio-economic measure was compared by survey year, revealing no substantive differences. One exception was the measure of urbanicity, which changed slightly in 2006 from Metropolitan Statistical Area (MSA) in a central city to include Core Based Statistical Area (CBSA) in a principal city.

A categorical treatment group measure defined one intervention group and two comparison groups: the "intervention" group included children eligible for the ACA's subsidized insurance and Medicaid expansion efforts, the first comparison group ("Medicaid/CHIP group") includes children eligible for Medicaid or CHIP prior to the implementation of the ACA, and the second comparison group ("400% FPL group") are children in families with incomes at or above 400% of the Federal Poverty Level (FPL). Theoretically, subsidized insurance and Medicaid expansion through the ACA in 2014 (i.e., insurance expansion) would not impact the two comparison groups since children in the Medicaid/CHIP group are already eligible for public insurance both before and after expansion, and children in the 400% FPL group do not qualify for subsidized insurance, which is limited to households from 130% to ≤400% FPL. Income eligibility levels for the intervention and Medicaid/CHIP comparison group were determined using NHIS family income data and various online resources with historical records of Medicaid & CHIP eligibility thresholds in each state.[78]

Analytic Approach. A well-known challenge with health insurance research is the endogeneity of insurance; in other words, factors that determine whether or not an individual has

insurance are usually the same factors that determine health and health behaviors. To address this issue, we employed a nonequivalent comparison group design by conducting a difference-in-difference-in difference (DDD) multivariable regression analysis.[36] Using the DDD approach, we isolate the effect of health insurance with an external event that has a direct impact on insurance (insurance expansion in 2014), and compare outcomes over time between treatment groups to control for unmeasured or unobservable characteristics that also determine health or health care use such as policies, new technology, and historical events. For the results of a DDD analysis to be valid, we verified whether the change in disparities between Hispanic and NH-white children in the comparison groups follow the same trend in the intervention group from 2005 to 2013 before insurance expansion was implemented (parallel trends assumption).[38]

The following DDD analysis was used for each individual child *i* at time *t* accounting for state-fixed effects *j*:

$$Pr(Y_{ijt}|Xs)=\beta_0 + \beta_1 X_{ijt} + \beta_2[yr_t] + \beta_3[treat_i] + \beta_4[raceth_i] + \beta_5[treat_i \times yr_t] + \beta_6[yr_t \times raceth_i] + \beta_7[treat_i \times raceth_i] + \beta_8[treat_i \times yr_t \times raceth_i]$$

where *X* indicates independent variables controlled for in the regression model including time and state fixed effects, *yr* indicates the time period before or after insurance expansion, *treat* specifies whether the child is in the intervention or one of the comparison groups, and *raceth* indicates whether the child is Hispanic or NH-white. Goodness of fit analyses were conducted for each model to ensure proper fit to each outcome variable. As a result, each health indicator used either logistic, probit, or complementary log-log regression models for binary variables. The margins command in STATA was used to predict adjusted percent estimates from the final non-linear models and their corresponding variance estimates. The first DDD analysis controlled for sex, age, and time and state-fixed effects. In disparities research, it is important to not adjust

out the disparity;[67] therefore, this paper presents estimates from the first adjustment. The second DDD analysis performed controlled for variables in the first adjustment and all descriptive variables previously outlined in Table 6. This adjustment will help explain if socio-economic and demographic characteristics further explain any of the disparities present in the first adjustments. All estimates were weighted using design variables with the appropriate survey specific commands in STATA 14. [79]

Missing Data. For each outcome and socio-economic demographic variable, less than 1% of responses were missing. Missing income values were imputed using five imputation files provided by NCHS.[77]

Results

When comparing the intervention group (i.e., the group that could be affected by the ACA) to the Medicaid/CHIP group, all descriptive characteristics were significantly different, except for sex (Table 6). Children in the Medicaid/CHIP were younger, with poorer overall health, and more were foreign-born. In addition, a lower proportion lived in households with two parents or with adults having more than a high school education compared to the intervention group. These findings were the same when comparing the intervention group to the 400% FPL group. The parallel trends assumption, in which we assume that the trends over time is similar for all treatment groups before reform, was met for all measures except private insurance coverage. Family income level is not shown in Table 6 since it was not used in the second adjustment. The treatment groups were created based on pre-insurance expansion income eligibility levels for Medicaid/CHIP or by family income at or above 400% FPL; therefore income was not included in the adjusted regression model to eliminate the likelihood of

multicollinearity. Of note, 98% of children in the intervention group lived in upper-middle class households (200%-399% FPL) and of those in the Medicaid/CHIP comparison group, 39% lived in low-income (<100% FPL) households and 47% lived in lower-middle class (100%-199%FPL) households.

The predicted margins estimates for insurance and utilization measures in Table 7 and 8 are generated from the same DDD model adjusting for sex, age, and time and state fixed effects. Table 7 evaluates the impact of insurance expansion on outcome measures for NH-white and for Hispanic children; whereas Table 8 shows estimates on the effect of insurance expansion on disparities in outcomes (Hispanic% – NH-White%).

Insurance Measures. The ACA had differential effects on insurance measures by treatment group, however the impact was minimal based on whether the child was Hispanic or NH-white (Table 7). In the 400% FPL group, there was no change in trends over time for having current insurance coverage and consistent insurance post-expansion in either racial/ethnic group. In the Medicaid/CHIP group, both NH-white and Hispanic children had a significant increase in current and consistent insurance coverage. In the intervention group, there was a significant decrease post-insurance expansion for having current insurance coverage among NH-white children and no significant changes post-expansion for Hispanic children. In the intervention group, neither racial/ethnic group had significant changes in consistent insurance coverage.

When comparing the intervention group with the 400% FPL group (Table 7), the trends over time before and after expansion were the same for both current and consistent insurance measures among NH-white and Hispanic children. However when comparing the intervention group to the Medicaid/CHIP group, children in the Medicaid/CHIP group had a significant uptake in insurance coverage by approximately 4-percentage points for both NH-white and

Hispanic children, and a significant increase in consistent insurance among NH-white children by 4-percentage points and among Hispanic children by 6-percentage points.

Similarly, we saw minimal changes when evaluating type of insurance stratified by racial/ethnic group (Table 7). A greater proportion of Hispanic children were insured by public insurance, and conversely a greater proportion of NH-white children had private insurance. The time trends before and after insurance expansion were not significantly different at the α=0.05 level in either racial/ethnic group. However at the α=0.10 level, there was a slight but significant increase in public and private insurance coverage among Hispanic children in the Medicaid/CHIP group post-expansion (Table 7).

Table 7 also shows some significant improvements in insurance measures among the Medicaid/CHIP group for both Hispanic and NH-white children; however, when evaluating changes for Hispanic children in relation to NH-white children (Table 8), there were no significant changes in disparities over time for current insurance coverage or for consistent insurance coverage. At the α=0.10 level, there was a slight narrowing of the disparity in private insurance coverage among insured children in the Medicaid/CHIP group, but there was no other evidence of post-expansion changes in type of insurance coverage trends between insured Hispanic and NH-white children. Overall, we do not see that health expansion has had an impact on disparities in insurance measures when comparing the intervention group to the Medicaid/CHIP group or to the 400% FPL group (Table 8).

Utilization of Care Measures. Disparity trends differed by treatment group for both the well-child check up and emergency room (ER/ED) visit measures. Before insurance expansion, there were no well-child check-up disparities between Hispanic and NH-white children in the intervention group and the 400% FPL group (Table 8). This did not change post expansion for

the intervention group. However, in the 400% FPL group, well-child check-ups decreased post-expansion among Hispanic children (Table 7), resulting in a significant disparity post expansion (Table 8). In the Medicaid/CHIP group, Hispanic children were less likely than NH-white children to have a well-child check-up before expansion, and this disparity persisted post-expansion. Overall, the results show no significant impact of insurance expansion on well-child check-up disparities when comparing the intervention group with the Medicaid/CHIP or 400% FPL group (Table 8).

Utilization of the emergency room/department (ER/ED) varied by treatment group before expansion as shown in Tables 2 and 3. In the 400% FPL group, Hispanic children were more likely to use the ER/ED compared to NH-white children (Table 7: 18% and 15%, respectively; Table 8: p=0.002), whereas the opposite was seen in the Medicaid/CHIP group where slightly fewer Hispanic children used the ER/ED (Table 7: 21.2% and 22.9%; Table 8: p=0.006). Differences between Hispanic and NH-white children in both comparison groups were no longer significant post-expansion; however, the change in disparity trends was only significant in the Medicaid/CHIP group (p=0.03). No disparities in ER/ED visits were evident before or after insurance expansion for the intervention group, and there was no evidence of significant impact of insurance expansion when comparing the intervention group to the Medicaid/CHIP group or the 400% FPL group (Table 8).

Discussion

Using a strong quasi-experimental design and high-quality national data, we find no evidence of significant changes in racial/ethnic disparities in insurance coverage and consistent coverage after insurance expansion in any treatment group. We did find evidence, however, of

significant gains in insurance coverage and consistent coverage attributable to insurance expansion for both Hispanic and NH-white children in the Medicaid/CHIP comparison group. Importantly, we found that Hispanic children continue to be less likely to have insurance and to have gaps in insurance coverage throughout the year even after states were allowed to expand Medicaid and provide insurance subsidies through the health insurance marketplace.

These findings underscore the importance of quasi-experimental designs when evaluating the impact of health policies on population subgroups. The DDD approach takes the analysis one step further than a traditional regression or Difference-in-Difference analysis by taking into account treatment groups for which the policy would have different effects. Our approach revealed that the impact of the ACA insurance expansion efforts were significant for children who had been eligible to Medicaid/CHIP at pre-expansion income eligibility levels despite being Hispanic or NH-white, and that expanding Medicaid and implementing the Health Insurance Marketplace was not enough to influence insurance enrollment and consistent coverage in the intervention group.

Before insurance expansion, significant differences for well-child check-ups and ER/ED visits between Hispanic and NH-white children were apparent only in the Medicaid/CHIP comparison group. Post-insurance expansion, there were no changes in use of well-child check-ups and ER/ED visits among Hispanic and NH-white children in the Medicaid/CHIP comparison group. Subsequently, we found no impact of insurance expansion on disparities in utilization of care measures. It is important to note, however, that it is possible that disparities in other access and utilization of care outcomes could have been reduced since only a select number of outcomes were evaluated.

Several factors may have limited the impact of the ACA on the disparities we examined between NH-white and Hispanic children. First, as of January 2015, 28 of 50 states had adopted the Medicaid expansion, leaving a gap in access to affordable health insurance coverage in states that did not expand Medicaid among families in the intervention group with income less than 133% of the federal poverty level (FPL) who did not qualify for Medicaid.[80] Theoretically, CHIP should have covered a majority of children in households under 133% FPL; however, some CHIP programs have premiums, which may still be unaffordable for low-income families. Additionally, undocumented immigrants and U.S. residents in the U.S. for less than 5 years are ineligible for subsidized insurance and exempt from the individual mandate. As of 2014, approximately 10 million Hispanic children in the U.S. were 1st generation (foreign-born) or 2nd generation (U.S.- born with a foreign-born parent) immigrants, accounting for 55% of all 1st and 2nd generation children in the U.S..[81] Immigrant families with undocumented family members may fear deportation, and therefore limit their engagement in government-sponsored benefits.[82] Finally, some research suggests that families who were eligible for subsidized insurance through the marketplace may have found it more affordable to pay the penalty instead.[83,84]

Health policies can differentially impact disadvantaged minority populations, and some of these realities can be concealed by population average estimates. Unlike the Ortega study,[33] we were able to evaluate some of the driving forces behind the population average trends for both insurance measures. For instance, both Hispanic and NH-white children experienced a 4-percentage point increase in insurance coverage due to the ACA insurance expansion efforts (similar trends were found for continuous-insurance coverage). Although insurance uptake was proportionally similar for Hispanic and NH-white children within the Medicaid/CHIP comparison group, Hispanic children are more likely to have lower income than NH-white

children overall. Therefore, a majority of Hispanic children (72%) are within income eligibility levels for the Medicaid/CHIP treatment group, whereas a smaller proportion of NH-white children (34%) fell within the Medicaid/CHIP treatment group parameters. Accordingly, since most Hispanic children were in the treatment group that experienced the most gains in insurance coverage, the population average estimates show a larger uptake in insurance coverage among Hispanics compared to NH-white children overall.[33]

The significant uptake in health insurance coverage among NH-white and Hispanic children who were income eligible for Medicaid/CHIP before and after 2014 is similar to the "spill-over effect" that occurred during the implementation of CHIP in 1997. When CHIP expanded insurance coverage to children who were not eligible for Medicaid, studies on CHIP implementation found that insurance coverage also increased among children who were eligible for Medicaid and characterized this as a spill-over effect.[1] One explanation advanced in the literature for the spill-over effect was the intense outreach efforts and the streamlined enrollment process prompted by CHIP implementation.[1] The ACA implemented a campaign to increase awareness of the new marketplace and streamline enrollment for Medicaid and subsidized insurance through the marketplace websites, which may have influenced and facilitated the enrollment of Medicaid/CHIP-eligible children who were uninsured prior to insurance expansion.

Families in the Medicaid-eligible group may also be more sensitive than those in the intervention group to the financial penalties imposed for not having health insurance by the individual mandate. The cost of enrollment for Medicaid- and CHIP-eligible children can range from no cost to a small premium based on income among CHIP-eligible children, and therefore the penalty can be greater than the cost of enrollment for families with children who qualify for

Medicaid/CHIP. Conversely, the subsidies for insurance in the marketplace may not be high enough to influence enrollment in the intervention group. Whether the gains in insurance coverage and consistent insurance coverage are sustained in the Medicaid/CHIP comparison group after the removal of the individual mandate remains to be seen.

Limitations. These findings are based on information reported by an adult living in the child's household, and may be subject to response bias; moreover, this bias could differ for Hispanic and NH white respondents.[85,86] Even though this study uses a quasi-experimental design, causality should be inferred with caution given that the comparison groups differed from the intervention group by several socio-economic and demographic factors. Therefore external factors, such as the individual mandate, may have had differential effects on one treatment group over another. Evaluating treatment groups is also a challenge with nationally implemented health policies. However, we were able to stratify groups by those who would have varying levels of impact based on income eligibility to Medicaid/CHIP and subsidized insurance coverage. Furthermore, the Medicaid/CHIP thresholds used to create the Medicaid/CHIP and Intervention treatment groups could not capture everyone that qualified for public insurance since other factors, such as having a disability, could qualify a child for Medicaid. Finally, it is also important to note that our conclusions about the influence of the ACA on disparities are limited to select health care access and utilization outcomes.

Conclusion

Although the ACA did not improve NH-White/Hispanic racial/ethnic disparities for insurance measures, it was successful in other ways. Insurance expansion increased and sustained health insurance coverage among children who met pre-insurance expansion income

eligibility for Medicaid & CHIP. A larger proportion of Hispanic children are Medicaid/CHIP eligible compared to NH-white children, therefore the uptake was more apparent among Hispanic children in the overall population.[87] Over and above this success, expanding insurance was not enough to improve disparities since the impact of expanding insurance was the same for both NH-white and Hispanic children. Closing the gap for insurance coverage measures between NH-white and Hispanic children might require additional interventions targeted to Hispanic communities. As health care policies continue to evolve, this study underscores the importance of retaining policies that maintain or expand Medicaid/CHIP coverage for children.

Tables and Figures

Table 5. Health Insurance and Healthcare Use Outcome Measures

Domain	Outcome Measures
1) Health Insurance	*Children who had:* – Health insurance at time of interview (currently insured) – No gaps in health insurance coverage in the past year (consistently insured) – Had public health insurance coverage – Had private health insurance coverage
2) Health Care Use	*Children who had:* – A well-child checkup in the past year – Any emergency room or emergency department (ER/ED) visit in past year

Note: The 400% FPL group includes children who live in households with a family income at or above 400% of the Federal Poverty Level (FPL); the Medicaid group includes children who are eligible for Medicaid or CHIP prior to the expansion of insurance coverage in 2014.

Table 6. Descriptive Characteristics among Hispanic & NH-White Children Living in the U.S., 2005-2015

Descriptive Characteristics	Intervention Group (n=22,666)		Comparison Groups: Medicaid Eligible (n=46,051)		Comparison Groups: ≥400% of FPL (n=26,568)	
Child's Age	*Percent (Standard Error)*					
0 to 5 years	31.9	(0.39)	36.1	(0.28)	29.8	(0.43)
6 to 11 years	32.6	(0.43)	33.3	(0.27)	32.4	(0.38)
12 to 17 years	35.4	(0.46)	30.7	(0.30)	37.9	(0.36)
Child's Sex						
Male	51.0	(0.44)	**51.1**	**(0.31)**	**51.5**	**(0.38)**
Child's Race/Ethnicity						
NH-white	79.7	(0.42)	55.0	(0.66)	89.2	(0.25)
Hispanic	20.3	(0.42)	45.0	(0.66)	10.8	(0.25)
Child's Functional Limitations & Rx use [1]						
Has limitations/Rx use for 3+ months	82.3	(0.31)	81.2	(0.28)	**82.0**	**(0.30)**
Perceived Overall Health of Child						
Excellent/very good	88.5	(0.28)	76.6	(0.31)	93.4	(0.20)
Good	10.5	(0.26)	20.6	(0.30)	6.1	(0.19)
Fair/Poor	1.1	(0.08)	2.7	(0.10)	0.5	(0.05)
Child's Birth Place						
Born in the U.S.	97.9	(0.11)	94.2	(0.16)	**97.8**	**(0.11)**
Parents in Family[2]						
Two parent family	80.5	(0.35)	63.2	(0.36)	89.5	(0.24)
Single parent family	17.6	(0.33)	33.3	(0.34)	9.5	(0.22)
No parents	1.9	(0.11)	3.4	(0.11)	1.0	(0.07)
Number of Children in Family						
One	23.1	(0.33)	17.0	(0.20)	30.2	(0.37)
Two	41.4	(0.42)	33.6	(0.28)	47.3	(0.39)
Three	24.1	(0.39)	27.8	(0.29)	17.5	(0.41)
Four or more	11.5	(0.40)	21.6	(0.32)	5.1	(0.25)
Highest Education Level in Family						
< High school	3.5	(0.17)	21.0	(0.42)	0.7	(0.07)
GED/high school (HS) degree	17.1	(0.36)	29.9	(0.31)	5.8	(0.17)
> HS, no degree or AA degree	40.2	(0.43)	35.0	(0.38)	20.5	(0.40)
Bachelor's or graduate degree	39.2	(0.53)	14.2	(0.28)	73.1	(0.48)
Lives in MSA or CBSA/MSA[3]						
Large MSA or CBSA/MSA	44.0	(0.96)	46.4	(0.86)	60.1	(0.91)
Small MSA or CBSA/MSA	36.4	(1.14)	33.2	(0.95)	30.1	(0.92)
Not in an MSA or CBSA/MSA	19.6	(1.00)	20.4	(0.94)	9.9	(0.60)

[1] Children who have conditions that cause daily limitations or require use of prescriptive medicines for 3/more months.
[2] Parent is defined as a biological, adoptive, step or foster parent living in the household.
[3] Prior to 2006, the NHIS measured if household was in/out of a Metropolitan Statistical Area (MSA) in a Central City. In 2006, the NHIS measures if household is within an MSA or Core Based Statistical Area (CBSA) in a principal city.
Note: **E**stimates in **bold font** are not significantly different from intervention group estimates (Chi-square p-value >0.05). All other comparison group estimates are significantly different from intervention group estimates.

Table 7. Triple Difference Results for Health Insurance and Utilization of Care Measures among Children Stratified by Race/Ethnicity, Adjusted by Age, Sex, and Time and State-Fixed Effects

Measures by Treatment Groups	*Percent(%) or Percentage-Point Difference(%), P-value*						*Percent(%) or Percentage-Point Difference(%), P-value*					
	Non-Hispanic White Children						Hispanic Children					
	Before	After	Time Difference[2]		Overall Impact[1]		Before	After	Time Difference[2]		Overall Impact[1]	
Had Insurance Coverage at time of Interview												
Intervention	94.7%	92.9%	-1.8%	0.001			89.7%	89.6%	-0.1%	0.950		
Medicaid Group	89.9%	92.1%	2.2%	0.003	-4.0%	<0.001	85.0%	88.8%	3.8%	<0.001	-3.9%	<0.001
400% FPL Group	98.1%	97.5%	-0.5%	0.149	-1.2%	0.138	95.3%	95.4%	0.1%	0.933	-0.2%	0.471
Had Consistent Insurance Coverage												
Intervention	91.2%	89.6%	-1.5%	0.097			85.8%	83.9%	-1.9%	0.175		
Medicaid Group	83.8%	86.5%	2.7%	0.002	-4.3%	<0.001	80.1%	84.3%	4.2%	0.000	-6.1%	0.000
400% FPL Group	96.3%	95.8%	-0.5%	0.346	-1.1%	0.257	93.5%	92.2%	-1.2%	0.395	-0.6%	0.768
Had Public Health Insurance												
Intervention	10.8%	9.0%	-1.8%	0.012			23.4%	22.3%	-1.0%	0.496		
Medicaid Group	48.7%	50.4%	1.8%	0.156	-3.6%	0.010	67.6%	69.4%	1.8%	0.107	-2.8%	0.127
400% FPL Group	2.6%	2.2%	-0.4%	0.243	-1.4%	0.060	8.4%	6.3%	-2.1%	0.141	1.0%	0.604
Had Private Health Insurance												
Intervention	84.1%	85.1%	1.0%	0.298			66.5%	68.3%	1.8%	0.303		
Medicaid Group	41.4%	40.2%	-1.0%	0.390	2.1%	0.139	16.9%	18.4%	1.4%	0.101	0.3%	0.863
400% FPL Group	95.5%	96.0%	0.5%	0.311	0.6%	0.569	87.1%	89.7%	2.6%	0.152	-0.9%	0.695
Had a Well-Child Check-Up in Past Year												
Intervention	77.9%	78.2%	0.3%	0.772			77.9%	75.3%	-2.6%	0.149		
Medicaid Group	74.9%	75.6%	0.7%	0.501	-0.4%	0.815	71.8%	71.4%	-0.3%	0.753	-2.3%	0.232
400% FPL Group	84.8%	84.6%	-0.2%	0.861	0.5%	0.735	83.9%	80.0%	-3.9%	0.054	1.3%	0.608
Had Any Visits to Emergency Room in Past Year												
Intervention	17.5%	15.3%	-2.2%	0.042			16.5%	16.3%	-0.2%	0.915		
Medicaid Group	22.9%	21.6%	-1.3%	0.198	-0.9%	0.502	21.2%	22.8%	1.6%	0.119	-1.8%	0.368
400% FPL Group	15.0%	13.8%	-1.2%	0.172	-1.0%	0.474	18.0%	16.5%	-1.5%	0.475	1.3%	0.615

Note: *Before* and *After* indicated percent estimates before or after insurance reform. None of the estimates have an absolute 95% confidence interval (CI) width ≥ 30. Predicted percent estimates are adjusted by sex, age, and state-fixed effects.

[1]In the Medicaid and 400% FPL rows, the Overall Impact = [Intervention Time Difference (TD)] – [Medicaid TD or 400% FPL TD]. Negative values denote a decline.

[2] Time Difference = [Before Expansion] - [After Expansion]. Negative values indicate Hispanic children fare worse than NH-white children for a given measure and vice versa.

Table 8. Triple Difference Results for Health Insurance and Utilization of Care Disparities between Hispanic and NH-White Children, Adjusted by Age, Sex, and Time and State-Fixed Effects

Insurance & Utilization Measures by Treatment Group	Disparities[1]				Time Difference[2]		Overall Impact	
	Before Expansion		After Expansion		[Before - After]		DDD[3]	
	Percentage-Point Difference (%), P-value							
Had Insurance Coverage at time of Interview								
Intervention	-5.0%	<0.001	-3.3%	0.009	-1.7%	0.239		
Medicaid Group	-4.9%	<0.001	-3.3%	<0.001	-1.6%	0.123	-0.1%	0.962
400% FPL Group	-2.8%	<0.001	-2.1%	0.074	-0.6%	0.609	-1.1%	0.592
Had Consistent Insurance Coverage								
Intervention	-5.4%	<0.001	-5.7%	<0.001	0.3%	0.834		
Medicaid Group	-3.7%	<0.001	-2.2%	0.035	-1.5%	0.217	1.8%	0.351
400% FPL Group	-2.8%	<0.001	-3.6%	0.014	0.8%	0.615	-0.5%	0.837
Had Public Health Insurance								
Intervention	12.6%	<0.001	13.3%	<0.001	-0.8%	0.628		
Medicaid Group	19.0%	<0.001	19.0%	<0.001	0.0%	0.985	-0.7%	0.753
400% FPL Group	5.7%	<0.001	4.0%	0.002	1.7%	0.244	-2.4%	0.240
Had Private Health Insurance								
Intervention	-17.5%	<0.001	-16.8%	<0.001	-0.7%	0.698		
Medicaid Group	-24.3%	<0.001	-21.9%	<0.001	-2.5%	0.065	1.7%	0.466
400% FPL Group	-8.4%	<0.001	-6.3%	<0.001	-2.2%	0.258	1.4%	0.554
Had a Well-Child Check-Up in Past Year								
Intervention	0.0%	0.983	-2.9%	0.108	2.9%	0.141		
Medicaid Group	-3.1%	<0.001	-4.2%	0.001	1.0%	0.457	1.9%	0.411
400% FPL Group	-0.9%	0.283	-4.6%	0.021	3.7%	0.070	-0.8%	0.767
Had Any Visits to Emergency Room in Past Year								
Intervention	-1.0%	0.198	1.0%	0.601	-2.0%	0.327		
Medicaid Group	-1.7%	0.006	1.2%	0.324	-2.9%	0.028	0.8%	0.743
400% FPL Group	3.0%	0.002	2.8%	0.132	0.3%	0.910	-2.3%	0.446

Note: None of the estimates have an absolute 95% confidence interval (CI) width ≥ 30. Predicted percent estimates are adjusted by sex, age, and state-fixed effects.

[1]Disparity = [Hispanic%] – [NH-White%]. Estimates that are negative values indicate Hispanic children fare worse than NH-white children for a given measure and vice versa.

[2] Time Difference= [Before Expansion] - [After Expansion]. Negative values indicate Hispanic children fare worse than NH-white children for a given measure and vice versa.

[3] DDD= [Intervention Time Difference (TD)] - [Medicaid TD or 400% FPL TD]. A positive value indicates an improvement (narrowing) of disparities due to insurance expansion.

Table 9. Triple Difference Results for Health Insurance and Utilization of Care Measures among Children Stratified by Race/Ethnicity, Adjusted by Age, Sex, and Socioeconomic and Demographic Characteristics

Measures by Treatment Groups	*Percent (%) or Percentage-Point Difference (%), P-value*						*Percent (%) or Percentage-Point Difference (%), P-value*					
	Non-Hispanic White						Hispanic					
	Before	After	Time Difference[2]		Overall Impact[1]		Before	After	Time Difference[2]		Overall Impact[1]	
Had Insurance Coverage at time of Interview												
Intervention	93.7%	92.1%	-1.6%	0.055			90.7%	90.5%	-0.2%	0.842		
Medicaid Group	89.7%	92.2%	2.5%	0.001	-4.1%	<0.001	89.0%	91.8%	2.9%	<0.001	-3.1%	0.022
400% FPL Group	97.1%	96.5%	-0.6%	0.233	-1.0%	0.267	94.8%	95.3%	0.5%	0.672	-0.7%	0.671
Had Consistent Insurance Coverage												
Intervention	90.2%	88.8%	-1.4%	0.157			86.9%	84.8%	-2.0%	0.133		
Medicaid Group	83.6%	86.6%	3.0%	0.001	-4.4%	<0.001	83.8%	87.3%	3.5%	<0.001	-5.5%	<0.001
400% FPL Group	95.1%	94.7%	-0.4%	0.456	-0.9%	0.244	93.1%	91.9%	-1.2%	0.448	-0.8%	0.691
Had Public Health Insurance												
Intervention	14.6%	12.6%	-2.0%	0.018			24.7%	22.8%	-1.8%	0.188		
Medicaid Group	43.1%	44.5%	1.4%	0.213	-3.4%	0.020	56.9%	58.0%	1.1%	0.357	-2.9%	0.003
400% FPL Group	6.6%	5.6%	-0.9%	0.167	-1.1%	0.035	13.7%	10.7%	-3.0%	0.096	1.2%	0.454
Had Private Health Insurance												
Intervention	77.6%	79.18%	1.6%	0.088			66.1%	68.5%	2.5%	0.090		
Medicaid Group	46.6%	46.42%	-0.2%	0.279	1.8%	0.036	29.7%	31.8%	2.1%	0.055	0.4%	0.066
400% FPL Group	89.1%	90.55%	1.4%	0.012	0.2%	0.864	79.0%	83.3%	4.3%	0.080	-1.8%	0.777
Had a Well-Child Check-Up in Past Year												
Intervention	76.4%	77.2%	0.8%	0.493			78.7%	76.6%	-2.2%	0.211		
Medicaid Group	75.6%	76.6%	1.0%	0.315	-0.2%	0.906	76.7%	76.2%	-0.5%	0.605	-1.7%	0.347
400% FPL Group	81.9%	82.1%	0.2%	0.854	0.6%	0.676	82.2%	78.8%	-3.5%	0.094	1.3%	0.601
Had Any Visits to Emergency Room in Past Year												
Intervention	17.5%	15.3%	-2.2%	0.042			16.8%	16.7%	-0.1%	0.972		
Medicaid Group	22.9%	21.6%	-1.3%	0.198	-0.9%	0.502	20.6%	22.2%	1.5%	0.110	-1.6%	0.406
400% FPL Group	15.0%	13.8%	-1.2%	0.172	-1.0%	0.474	19.5%	18.0%	-1.4%	0.504	1.4%	0.603

Note: *Before* and *After* indicated percent estimates before or after insurance reform. None of the estimates have an absolute 95% confidence interval (CI) width ≥ 30. Predicted percent estimates are adjusted by sex, age, and state-fixed effects.

[1] In the Medicaid and 400% FPL rows, the Overall Impact = [Intervention Time Difference (TD)] – [Medicaid TD or 400% FPL TD]. Negative values denote a decline.

[2] Time Difference = [Before Expansion] - [After Expansion]. Negative values indicate Hispanic children fare worse than NH-white children for a given measure and vice versa

Table 10. Triple Difference Results for Health Insurance and Utilization of Care Disparities between Hispanic and NH-White Children, Adjusted by Age, Sex, and Socioeconomic and Demographic Characteristics

Insurance & Utilization Measures by Treatment Group	Disparities[1]				Time Difference[2]		Overall Impact	
	Before Expansion		After Expansion		[Before - After]		DDD[3]	
	Percentage-Point Difference(%), P-value							
Had Insurance Coverage at time of Interview								
Intervention	-3.0%	<0.001	-1.7%	0.182	-1.4%	0.352		
Medicaid Group	-0.8%	0.132	-0.4%	0.633	-0.4%	0.694	-1.0%	0.576
400% FPL Group	-2.3%	<0.001	-1.3%	0.297	-1.1%	0.418	-0.3%	0.886
Had Consistent Insurance Coverage								
Intervention	-3.3%	<0.001	-4.0%	0.006	0.7%	0.671		
Medicaid Group	0.2%	0.737	0.7%	0.486	-0.5%	0.665	1.16%	0.541
400% FPL Group	-2.0%	<0.001	-2.8%	0.077	0.8%	0.646	-0.10%	0.966
Had Public Health Insurance								
Intervention	10.0%	<0.001	10.3%	<0.001	-0.2%	0.886		
Medicaid Group	13.8%	<0.001	13.5%	<0.001	0.3%	0.839	-0.5%	0.815
400% FPL Group	7.1%	<0.001	5.0%	0.004	2.1%	0.283	-2.3%	0.344
Had Private Health Insurance								
Intervention	-11.5%	<0.001	-10.6%	<0.001	-0.7%	0.698		
Medicaid Group	-17.0%	<0.001	-14.7%	<0.001	-2.5%	0.065	1.7%	0.466
400% FPL Group	-10.2%	<0.001	-7.3%	0.004	-2.2%	0.258	1.4%	0.554
Had a Well-Child Check-Up in Past Year								
Intervention	2.3%	0.004	-0.7%	0.707	3.0%	0.129		
Medicaid Group	1.1%	0.090	-0.4%	0.756	1.5%	0.253	1.5%	0.505
400% FPL Group	0.4%	0.685	-3.3%	0.105	3.7%	0.085	-0.7%	0.804
Had Any Visits to Emergency Room in Past Year								
Intervention	-1.5%	0.065	0.2%	0.903	-1.71%	0.420		
Medicaid Group	-0.8%	0.196	1.9%	0.097	-2.71%	0.025	1.0%	0.692
400% FPL Group	2.6%	0.013	2.2%	0.255	0.40%	0.865	-2.1%	0.502

Note: None of the estimates have an absolute 95% confidence interval (CI) width ≥ 30. Predicted percent estimates are adjusted by sex, age, and state-fixed effects.

[1]Disparity = [Hispanic%] – [NH-White%]. Estimates that are negative values indicate Hispanic children fare worse than NH-white children for a given measure and vice versa.

[2] Time Difference= [Before Reform] - [After Reform]. Negative values indicate Hispanic children fare worse than NH-white children for a given measure and vice versa.

[3] DDD= [Intervention Time Difference (TD)] - [Medicaid/CHIP TD or 400% FPL TD]. A positive value indicates an improvement (narrowing) of disparities due to insurance reform.

Chapter 4

The Affordable Care Act Reduced High Financial Burden from Children's Medical Costs among Families with Hispanic and Non-Hispanic White Children

Background

A primary goal of the ACA was to reduce the financial burden of medical costs to families and individuals – a significant problem that was becoming more and more evident before the Affordable Care Act was enacted. For example, one study found in 2007 that 62% of all bankruptcies filed in the U.S. were related to illness or medical bills.[88] Furthermore, U.S. families have been facing the strain of patient cost-sharing rising faster than annual incomes. From 2000 to 2007, the year prior to the Great Recession, wages increased by 3% for the 50th percentile of the population, and 2% for the lowest 10th percentile. In contrast, the proportion of co-payments that were $20 or higher was 17% in 2000, which increased to 61% in 2007. For that same time period, deductibles more than doubled.[19,89]

Increased cost-sharing affects vulnerable populations differentially. A study by Galbraith and colleagues found that out-of-pocket costs for low-income families account for a greater portion of their family's income compared to families in all other income groups.[90] The literature also shows that increased cost-sharing is especially tough financially for those with chronic conditions and with children who have special health care needs.[91,92]

Health insurance coverage has been known as being the financial safety net for a family's medical expenses. One study by Gross and Notowidigdo found that bankruptcies were reduced by 8% for every 10%-point increase in Medicaid income eligibility.[93] However, having health

insurance coverage had steadily declined from 58.5% in 2000 to 51.4% in 2010 among all ages, eroding the financial safety net.[76]

The way that U.S. families engage in the health care system could be significantly influenced by the steady deterioration of financial safety nets and increased care cost-sharing might affect families with children more than individuals. The Rand Health Insurance Experiment (HIE) found that high out-of-pocket costs decreased the use of health care, especially preventive care services,[18] yet when it came to children's health care, parents were less sensitive to price.[16] Since parents are likely to utilize needed services for their children despite higher out-of-pocket costs, the financial burden of a child's medical care may fall disproportionately on families who cannot afford health insurance coverage or have high deductible plans.

The Affordable Care Act (ACA) aimed to not just curb health care costs as a whole, but to also mitigate the burden of health care costs on U.S. families. Key aspects of the ACA's insurance expansion efforts occurred in 2014, including implementation of the individual mandate, access to subsidized insurance through state and federal insurance marketplaces (healthcare.gov), and expansion of Medicaid.[73,74] Although implemented in most states, some states opted to not expand Medicaid and some implemented the Medicaid expansion before 2014.[75]

Given that the lowest uninsured rate in U.S. history occurred in 2016 when health insurance enrollment increased to 91% nationwide among all ages,[76] the ACA has the potential to reduce financial burden among U.S. families. Therefore, the purpose of this study was to evaluate whether the insurance expansion efforts through the ACA can reduce financial burden due to a child's medical costs. We also explore whether the effects of the ACA differed by Hispanic compared to Non-Hispanic (NH) White children and their families. Hispanic families,

especially limited English proficiency families who are more likely to be recent immigrants, face unique insurance access and healthcare barriers compared to other racial/ethnic groups.[64]

How Hispanic families engage in the healthcare system might influence the effect of the ACA on financial burden due to medical care. The ACA may not change the healthcare use of Hispanic families as much as NH-white families because the ACA did not address other barriers that affect healthcare use, like language and transportation difficulties.[11] Furthermore, barriers to receiving public insurance, like immigration status, might disproportionally affect Hispanics more than NH-white families, and limits the potential impact that the ACA might have on accessing affordable healthcare coverage to reduce the cost of health care utilization.

Methods

Data Source. The data for this study come from the National Health Interview Survey (NHIS), which is an in-person interview survey on various health, health care, and health behavior topics. The NHIS is conducted by the National Center for Health Statistics (NCHS) on the civilian non-institutionalized U.S. population. This analysis used NHIS annual data from 2005 to 2015. NCHS restricts public access to data that can directly or indirectly compromise the confidentiality of survey respondents. Therefore, sensitive data used in this analysis was accessed through the Northwest Federal Statistical Research Data Center at the University of Washington. Detailed documentation on the NHIS is available on the NCHS website.[77]

Study Design & Sample. A quasi-experimental design was conducted among Hispanic and NH-white children and their families. Insurance expansion implemented in 2014 through the ACA was the policy intervention being tested in this study. Changes in financial burden due to medical care were evaluated before (2005-2013) and after (2014-2015) the policy was enacted.

The study was based on the NHIS Selected Child sample, which included children aged 0 to 17 years old (N=95,285), where one child was randomly selected from each family, and a detailed interview was conducted with an adult (≥18 years old) living in the household who knew about the health of the family members who lived there.

An "intervention group" of children whose insurance status was affected by the ACA was compared to two groups who were theoretically not affected by ACA. The treatment groups were created based on Medicaid expansion and Health Insurance Marketplace income eligibility levels in the respondents' state of residence. Income eligibility levels for the treatment groups were determined using the child's family income as percent of the Federal Poverty Level (FPL). The intervention group included children whose insurance status could be affected by the ACA, by becoming eligible for the ACA's subsidized insurance through the Insurance Marketplace or through the state's Medicaid expansion efforts after implementation in 2014.

Theoretically, the implementation of subsidized insurance and Medicaid expansion through the ACA in 2014 would not impact the two comparison groups. The first comparison group ("Medicaid/CHIP group") includes children who were eligible for Medicaid or CHIP during the entire study period (2005 to 2015) before and after Medicaid expansion efforts. The inclusion criteria for the Medicaid/CHIP group was based on various online resources with historical records of Medicaid & CHIP eligibility thresholds in each state.[78] The second comparison group ("400% FPL group") includes children whose families had incomes at or above 400% of the Federal Poverty Level (FPL). Children in the 400% FPL group are less likely to qualify for Medicaid and do not qualify for subsidized insurance, which is limited to households from 130% to ≤400% FPL.

Changes in the child's family burden were compared between the intervention group and comparison groups before (2005-2013) and after (2014-2015) insurance expansion. This study design controlled for external events, like the great recession, that happened before and after reform that can affect how families accessed health insurance.

Measures. The construct of financial burden due to medical costs was defined as "the family's perception of financial stress and worry caused by inadequate monetary resources to meet the family's fiscal demands."[94] Many studies have not been able to adequately operationalize financial burden. For instance, most studies operationalized this conceptualization of financial burden as out-of-pocket costs at or exceeding 5% or 10% of a family's income. However, these measures lacked the subjective experience of financial strain that captured the nuanced impact of burden. In other words, the same cut-points across all income groups were not comparable experiences. For this reason, this paper utilizes a dynamic measure of financial burden created and validated by Wisk and colleagues, which incorporated both quantitative and subjective aspects of financial burden.[94] The measure was previously validated using data from the Medical Expenditure Panel Survey.[94]

The family financial burden due to medical costs, the outcome variable for this study, was created using family income data, out-of-pocket costs, and questions about delayed/forgone care due to cost from the NHIS, and was comprised of four-categories: High, Mid-High, Mid-Low, and Low financial burden. Unlike previous measures of financial burden, this composite measure was based on how well it performed in predicting levels of unmet healthcare needs due to medical costs.[94] OOPC is the family's monetary expense for medical care excluding dental care and premiums in the past year. Since OOPC was a categorical measure (five categories from none to $5000 or more), the proportion of OOPC from a family's income was calculated by

dividing the mid-points of each OOPC category by a continuous measure of the child's family income and multiplying by 100. Out-of-pocket costs and income were adjusted to 2015 U.S. dollars based on the annual Consumer Price Index from the U.S. Bureau of Labor and Statistics.

Analysis Plan. A multivariate analysis using the triple difference estimator (DDD) approach was used to evaluate the impact of ACA's insurance expansion on family burden between Hispanic and Non-Hispanic white children. This model is described by:

$$Ologit(Pr(Y_{ijt}|Xs)) = \beta_0 + \beta_1 X_{ijt} + \beta_2[yr_t] + \beta_3[treat_i] + \beta_4[race_i] + \beta_5[treat_j \times yr_t] + \beta_6[yr_t \times race_i] + \beta_7[treat_i \times race_i] + \beta_8[treat_i \times yr_t \times race_i]$$

where i=individual, j=indexes of states, t=time period, Xs= Independent variables,
treat = intervention vs. comparison groups, yr = survey years, race = NH-white or Hispanic

where Y_{ijt} is financial burden for family i, in state j and time t; X indicates independent variables controlled for in the regression model including time and state fixed effects, *yr* indicates the time period before or after insurance reform, *treat* is a categorical dummy variable that specifies whether the child is in the intervention or one of the comparison groups, and *race* indicates the child's race/ethnicity.

Using the DDD approach, we isolate the effect of health insurance with an external event that has a direct impact on insurance (insurance expansion in 2014). The ordinal logistic regression model (shown above) was not run for Hispanic and NH-white children separately. Using the same model, adjusted percent estimates were produced using predicted margins to populate cells A to F in Table 11 and to calculated statistical differences; however, these results are shown separately for Hispanic and NH-white children. The impact of the ACA was evaluated for Hispanic and NH-white children using the margins command in STATA 14.[95] For each financial burden category, change over time was estimated within each intervention and comparison group, and the impact was calculated as the change over time in the intervention

group relative to the change over time in the comparison groups. Estimates were weighted to the U.S child population.

Results

Table 12 presents the descriptive characteristics of the children in the intervention and comparison groups. Compared to the intervention group, the Medicaid/CHIP group had a greater proportion of children who were younger, Hispanic, not U.S. born; and who live in homes that are in larger Metropolitan Statistical Areas (MSA) or Core Based Statistical Areas (CBSA), homes with more children, with a single parent, and in homes with lower income and education levels. In contrast, the 400% FPL group had a greater proportion of children who were older, NH-white; and who live in homes in larger MSAs or CBSAs, homes with less children, two parent homes, and with higher income and education levels. Compared to the intervention group, a greater proportion of parents reported fair/poor health in the Medicaid/CHIP group and excellent/very good health in the 400% FPL group. There were no significant differences by sex.

Table 13 presents the marginal impacts of the ACA on the financial burden of families for Hispanic versus NH-white children. Before and after ACA insurance reform, there were no significant disparities between Hispanic and NH-white children and their families within each level of financial burden (Table 13). Before the ACA, four out of five families in the ≥400% FPL group experienced low (48% Hispanic; 48% NH-white) or mid-low (35% Hispanic; 35% NH-white) financial burden. In contrast, about two-thirds of families in the intervention group experienced low (31% Hispanic; 26% NH-white) or mid-low (40% Hispanic; 40% NH-white) financial burden, and only about a third in the Medicaid/CHIP group experienced low (7%

Hispanic; 6% NH-white) or mid-low (23% Hispanic; 20% NH-white) financial burden before insurance reform (Table 13).

After Insurance reform, financial burden among Hispanic and NH-white children and their families in the intervention and the ≥400% FPL group were not significantly different from estimates before the ACA (Table 13). In contrast, financial burden did change significantly after insurance reform for families in both racial/ethnic groups in the Medicaid/CHIP group. Insurance expansion through the ACA significantly increased the proportion of Hispanic and NH-white families who reported mid-low financial burden by 3.0 and 4.8-percentage points, respectively (Table 13, Figure 2), and decreased the proportion that reported high financial burden by approximate 4.2 and 7.2-percentage points, respectively (Table 13, Figure 2) in the Medicaid/CHIP group. After adjusting for socio-economic and demographic characteristics (Table 14), the increase in mid-low financial burden, and the reduction in high financial burden in the Medicaid/CHIP group remained significant among Hispanic and NH-white children and their families.

In sum, financial burden did not change in the intervention group before versus after the ACA, but changes were found in the Medicaid/CHIP group. However, two-thirds of Hispanic and NH-white families continue to experience mid-high (39% Hispanic; 39% NH-white) or high (26% Hispanic; 27% NH-white) levels of financial burden in the Medicaid/CHIP group. In contrast, only a third of the intervention group, and one-sixth of the ≥400% FPL group, experienced mid-high or high financial burden from their child's health care costs.

Discussion

The ACA may not have significantly improved financial burden among families of children who were newly eligible for Medicaid expansion or insurance subsidies. However, the ACA did improve financial burden experienced among families of Hispanic and NH-white children in the Medicaid/CHIP group, which had higher levels of financial burden prior to insurance reform compared to the other two treatment groups. Socio-economic and demographic characteristics do not account for changes observed over time since the magnitude is similar but slightly smaller, and the effect remained statistically significant after adjusting for these factors (Table 14). It is possible that the Medicaid/CHIP group may have been more price-sensitive to the penalties imposed by the individual mandate, or that the outreach efforts and streamlined enrollment process created through the ACA helped pick up more uninsured children who had been Medicaid/CHIP eligible before reform.

These findings are consistent with a study by Spencer et al., which found significant gains in Medicaid/CHIP enrollment among children and adolescents from 2010 to 2016. Medicaid/CHIP enrollment increased among children 10 to 14 years old after insurance expansion efforts in 2015 and 2016, which partly offset a decrease in private insurance coverage that began in 2010. The study also found that Medicaid/CHIP coverage significantly increased among adolescents age 15 to 18 years old from 2010 to 2016 while private insurance coverage did not change over time for older adolescents.[28]

Among parents of children in the Medicaid/CHIP group, increased healthcare enrollment through the ACA could have also influenced family financial burden. About 86% of children in the Medicaid/CHIP group had family incomes <200% FPL, and Medicaid expansion through the ACA increased income eligibility to 138% FPL for parents in 29 states by 2015.[80] Many of the

gains in insurance access after insurance expansion in 2014 is due to an increase in healthcare coverage among low-income populations, who also experienced less out-of-pocket spending and less debt.[31,59,76,96] If parents enrolled in public health insurance after reform, this could have decreased their out-of-pocket costs. However, differential enrolment patterns by parents in each treatment group were not captured in this study, but might explain the improved distribution of financial burden in the Medicaid/CHIP group.

Families of NH-white children in the Medicaid/CHIP group had the greatest reduction in high financial burden over time, compared to Hispanics, yet this seems counterintuitive since Hispanic children are less likely to have health insurance coverage and more likely to be disadvantaged socioeconomically.[17,35] A possible explanation for this finding is that Hispanic families access less health care services than NH-white families. Hispanic children are significantly more likely to have no usual place of care and no personal doctor or nurse,[35] and less likely to have a preventive medical visit.[17,97]

There are various reasons why Hispanic families might be less likely to engage in the U.S. healthcare system. Access-related factors have been noted as the most significant barriers to equitable health care.[11] About one in five Hispanic adults reported not seeking medical care due to language barriers.[11] Hispanic families are also more likely to have problems obtaining referrals, and less likely to receive effective care coordination and family centered care, [35] which are institutionalized barriers to accessing health care. Immigration status is a barrier to accessing affordable coverage through Medicaid/CHIP. Twenty-two states restrict Medicaid/CHIP enrollment among non-citizen children, unless they are legally present for five years or more.[80] Even though not as many families of Hispanic children report high financial burden than NH-

white families, studies find that parents of Hispanic children are still more likely to report unmet medical needs than for NH-white children.[35,97]

Limitations. These findings are based on information reported by an adult living in the child's household, and therefore may be subject to response bias. Even though this study uses a quasi-experimental design, causality should be inferred with caution given that the comparison groups differed from the intervention group by several socio-economic and demographic factors. Therefore, temporal factors or other ACA policy changes besides insurance expansion may have had differential effects on one treatment group over another. Furthermore, the Medicaid/CHIP income eligibility thresholds used to create two of the treatment groups may not have captured everyone that qualified for public insurance (other factors, such as having a disability, could qualify a child for Medicaid).

Conclusion

This study found that families of Hispanic and NH-white children who were Medicaid/CHIP eligible before the enactment of ACA experienced less financial burden after the implementation of the individual mandate and insurance expansion efforts. No significant improvements in financial burden occurred in the other treatment groups. The results of this study can aid in the development of policies, and adds to the working knowledge on how the ACA impacts families in the U.S. Additional research is needed to evaluate whether differences in financial burdens experienced by Hispanic and NH-white families vary due to factors related to utilization of care, and parental eligibility and enrollment. Furthermore this study should be extended to other racial/ethnic groups with a history of lower access to health care.

Tables and Figures

Table 11. Example: Triple Difference Impact Analysis for Hispanic and NH-White Children

Treatment Group	Before Expansion	After Expansion	Time Difference [Before - After]*	Overall Impact DDD**
Intervention	A	B	A - B = G	
Medicaid/CHIP	C	D	C - D = H	G - H = DDD
400% FPL	E	F	E - F = I	G - I = DDD

* The change between percent estimates before (2005 to 2013) and after (2013 to 2015) insurance expansion
** The Triple Difference Estimator, which evaluates the overall impact of the reform controlling for trends observed in the comparison group.
Note: The *Intervention* group includes children who are not eligible for Medicaid/CHIP before reform and whose family income is <400% of the federal poverty level (FPL), the two comparison groups are the *Medicaid/CHIP* group composed of children eligible for Medicaid/CHIP before and after reform, and the *400% FPL* group composed of children whose family income was ≥400% of the FPL. The example table will be shown for each financial burden level and race/ethnicity group.

Table 12. Descriptive Characteristics for Hispanic and NH-White Children living in U.S., 2005-2015

Descriptive Characteristics	Intervention Group (n=22,666)		Medicaid Eligible (n=46,051)		≥400% of FPL (n=26,568)	
Child's Age	*Percent (Standard Error)*					
0 to 5 years	31.9	(0.39)	36.1	(0.28)	29.8	(0.43)
6 to 11 years	32.6	(0.43)	33.3	(0.27)	32.4	(0.38)
12 to 17 years	35.4	(0.46)	30.7	(0.30)	37.9	(0.36)
Child's Sex						
Male	51.0	(0.44)	**51.1**	**(0.31)**	**51.5**	**(0.38)**
Child's Race/Ethnicity						
NH-white	79.7	(0.42)	55.0	(0.66)	89.2	(0.25)
Hispanic	20.3	(0.42)	45.0	(0.66)	10.8	(0.25)
Child's Functional Limitations & Rx use [1]						
Has limitations/Rx use for 3+ months	82.3	(0.31)	81.2	(0.28)	**82.0**	**(0.30)**
Perceived Overall Health of Child						
Excellent/very good	88.5	(0.28)	76.6	(0.31)	93.4	(0.20)
Good	10.5	(0.26)	20.6	(0.30)	6.1	(0.19)
Fair/Poor	1.1	(0.08)	2.7	(0.10)	0.5	(0.05)
Child's Birth Place						
Born outside of US	2.1	(0.11)	5.8	(0.16)	**2.2**	**(0.11)**
Parents in Family[2]						
Two parent family	80.5	(0.35)	63.2	(0.36)	89.5	(0.24)
Single parent family	17.6	(0.33)	33.3	(0.34)	9.5	(0.22)
No parents	1.9	(0.11)	3.4	(0.11)	1.0	(0.07)
Number of Children in Family						
One	23.1	(0.33)	17.0	(0.20)	30.2	(0.37)
Two	41.4	(0.42)	33.6	(0.28)	47.3	(0.39)
Three	24.1	(0.39)	27.8	(0.29)	17.5	(0.41)
Four or more	11.5	(0.40)	21.6	(0.32)	5.1	(0.25)
Highest Education Level in Family						
< High school	3.5	(0.17)	21.0	(0.42)	0.7	(0.07)
GED/high school (HS) degree	17.1	(0.36)	29.9	(0.31)	5.8	(0.17)
> HS, no degree or AA degree	40.2	(0.43)	35.0	(0.38)	20.5	(0.40)
Bachelor's or graduate degree	39.2	(0.53)	14.2	(0.28)	73.1	(0.48)

[1] The measure captures children with conditions that cause daily limitations or require ≥3 months of prescriptive medicines.
[2] Parent is defined as a biological, adoptive, step or foster parent living in the household.
[3] Prior to 2006, the NHIS measured whether the household was in or out of a Metropolitan Statistical Area (MSA) in a Central City. In 2006, the NHIS measures if the household is within an MSA or Core Based Statistical Area (CBSA) in a principal city.

Note: **Bolded** estimates are not significantly different from intervention group estimates (Chi-sq p-value >0.05). All other comparison group estimates are significantly different from intervention group estimates.

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Descriptive Characteristics	Intervention Group (n=22,666)		Medicaid Eligible (n=46,051)		≥400% of FPL (n=26,568)	
Family Income						
<100% FPL	0.0	(0.00)	39.17	(0.42)	0.0	(0.00)
100% to 199% FPL	1.54	(0.13)	47.18	(0.41)	0.0	(0.00)
200-399% FPL	98.46	(0.13)	13.64	(0.30)	0.0	(0.00)
400% FPL or more	0.0	(0.00)	0.0	(0.00)	100.0	(0.00)
Lives in MSA or CBSA/MSA[3]						
Large MSA or CBSA/MSA	44.0	(0.96)	46.4	(0.86)	60.1	(0.91)
Small MSA or CBSA/MSA	36.4	(1.14)	33.2	(0.95)	30.1	(0.92)
Not in an MSA or CBSA/MSA	19.6	(1.00)	20.4	(0.94)	9.9	(0.60)

[1] The measure captures children with conditions that cause daily limitations or require ≥3 months of prescriptive medicines.
[2] Parent is defined as a biological, adoptive, step or foster parent living in the household.
[3] Prior to 2006, the NHIS measured whether the household was in or out of a Metropolitan Statistical Area (MSA) in a Central City. In 2006, the NHIS measures if the household is within an MSA or Core Based Statistical Area (CBSA) in a principal city.

Note: **Bolded** estimates are not significantly different from intervention group estimates (Chi-sq p-value >0.05). All other comparison group estimates are significantly different from intervention group estimates.

Table 13. Overall Impact of the ACA on Financial Burden for Children's Families by Hispanic and Non-Hispanic White Children

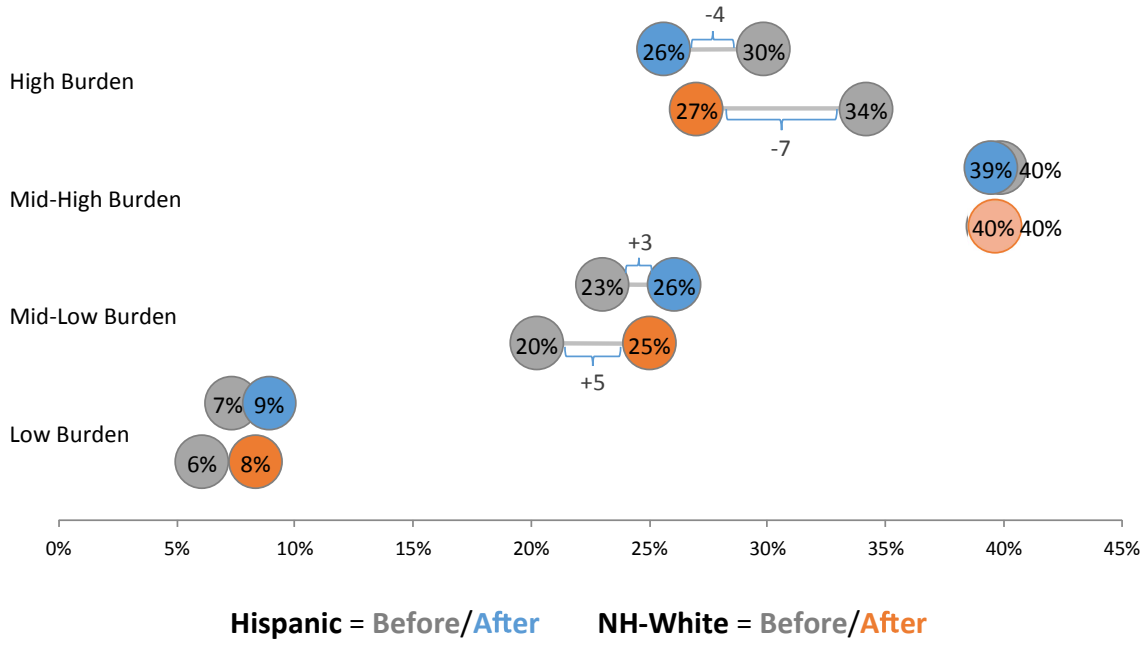
Financial Burden Levels by Treatment Group	Non-Hispanic White								Hispanic							
	Before Reform		After Reform		Time Difference[1]		Overall Impact[2]		Before Reform		After Reform		Time Difference[1]		Overall Impact[2]	
	Percent (Standard Error)				*Percent, P-value*				*Percent (Standard Error)*				*Percent, P-value*			
Low Financial Burden																
Intervention	25.7%	(0.49)	26.2%	(0.99)	0.5%	0.627			31.1%	(1.36)	32.7%	(1.76)	1.6%	0.449		
Medicaid/CHIP	6.1%	(0.34)	8.3%	(0.45)	2.3%	0.000	-1.8%	0.109	7.3%	(0.28)	8.9%	(0.37)	1.6%	0.000	0.0%	0.995
≥400% FPL	48.2%	(0.58)	49.4%	(0.96)	1.2%	0.223	-0.7%	0.608	48.4%	(1.35)	49.8%	(2.12)	1.4%	0.552	0.2%	0.937
Mid-Low Financial Burden																
Intervention	39.5%	(0.49)	39.6%	(0.48)	0.1%	0.617			39.9%	(0.43)	39.8%	(0.50)	-0.1%	0.611		
Medicaid /CHIP	20.2%	(0.48)	25.0%	(0.65)	4.8%	0.000	-4.7%	0.000	23.0%	(0.32)	26.1%	(0.51)	3.0%	0.000	-3.1%	0.000
≥400% FPL	35.4%	(0.32)	34.8%	(0.52)	-0.6%	0.228	0.6%	0.196	35.3%	(0.54)	34.6%	(0.97)	-0.6%	0.558	0.5%	0.619
Mid-High Financial Burden																
Intervention	26.0%	(0.38)	25.6%	(0.69)	-0.4%	0.627			22.1%	(1.04)	21.1%	(1.13)	-1.0%	0.443		
Medicaid /CHIP	39.5%	(0.29)	39.7%	(0.40)	0.1%	0.492	-0.5%	0.519	39.8%	(0.36)	39.4%	(0.38)	-0.4%	0.001	-0.6%	0.634
≥400% FPL	13.0%	(0.37)	12.5%	(0.46)	-0.5%	0.219	0.1%	0.875	12.9%	(0.68)	12.4%	(0.92)	-0.6%	0.547	-0.5%	0.769
High Financial Burden																
Intervention	8.9%	(0.27)	8.6%	(0.40)	-0.2%	0.623			6.9%	(0.56)	6.4%	(0.53)	-0.5%	0.432		
Medicaid /CHIP	34.2%	(0.70)	27.0%	(0.82)	-7.2%	0.000	7.0%	0.000	29.8%	(0.47)	25.6%	(0.67)	-4.2%	0.000	3.8%	0.000
≥400% FPL	3.4%	(0.17)	3.3%	(0.18)	-0.2%	0.218	0.0%	0.913	3.4%	(0.26)	3.2%	(0.31)	-0.2%	0.544	-0.3%	0.653

[1] Time Difference (TD) = %Before Insurance Reform - %After Insurance Reform

[2] Triple Difference Estimator = Comparison Group %-point TD - Intervention Group %-point TD

Note: The *Intervention* group includes children who were not eligible for Medicaid/SCHIP before insurance expansion but would have been eligible post-ACA insurance reform, the *Medicaid/CHIP* group were children eligible for Medicaid/SCHIP before and after reform, and the *400% FPL* group are children whose family income is ≥400% of the FPL and therefore unaffected by ACA Medicaid expansion. Estimates adjusted by sex, age, and time & state fixed effects.

Figure 2. Changes in the Percentage of Financial Burden Before versus After the Affordable Care Act Insurance Expansion in 2014 for Hispanic and Non-Hispanic White Children and families in the Medicaid/DHIP Group



Note: The *Medicaid/CHIP* group includes children eligible for Medicaid/SCHIP. Point estimates are shown before and after insurance reform in 2014 through the Affordable Care Act. Estimates adjusted by sex, age, and time & state fixed effects. The change over time (before – after reform) shown for *High* and *Mid-Low* financial burden are significantly different for NH-white compared to Hispanic children and their families. Before and after estimates for NH-White mid-high burden overlap.

Table 14. Overall Impact of the ACA on Financial Burden for Children's Families by Hispanic and Non-Hispanic White Children, Adjusting for Socioeconomic and Demographic Characteristics

Treatment Group	Non-Hispanic White				Hispanic			
	Time Difference[1]		Overall Impact[2]		Time Difference[1]		Overall Impact[2]	
	Percent, P-value				*Percent, P-value*			
Low Financial Burden								
Intervention	-1.1%	0.310			0.0%	0.987		
Medicaid/CHIP	1.8%	<0.001	-3.0%	**0.009**	1.0%	0.001	-1.0%	0.651
≥400% FPL	-0.7%	0.517	-0.4%	0.752	0.1%	0.963	-0.1%	0.980
Mid-Low Financial Burden								
Intervention	-0.2%	0.350			0.0%	0.907		
Medicaid/CHIP	3.9%	<0.001	-4.1%	<0.001	2.0%	0.001	-2.0%	0.001
≥400% FPL	0.3%	0.513	-0.5%	0.346	0.0%	0.969	0.1%	0.959
Mid-High Financial Burden								
Intervention	0.8%	0.313			0.0%	0.984		
Medicaid/CHIP	0.1%	0.705	0.8%	0.341	-0.1%	0.163	0.1%	0.937
≥400% FPL	0.3%	0.519	0.6%	0.531	-0.1%	0.959	0.0%	0.988
High Financial Burden								
Intervention	0.5%	0.320			0.0%	0.974		
Medicaid/CHIP	-5.8%	<0.001	6.2%	<0.001	-2.9%	<0.001	2.8%	0.006
≥400% FPL	0.1%	0.522	0.4%	0.423	0.0%	0.954	0.0%	

[1] Time Difference (TD) = %Before Insurance Reform - %After Insurance Reform

[2] Triple Difference Estimator = Comparison Group %-point TD - Intervention Group %-point TD

Note: The *Intervention* group includes children who are not eligible for Medicaid/CHIP before insurance expansion and whose family income is <400% of the federal poverty level (FPL), the *Medicaid/CHIP* group are children eligible for Medicaid/CHIP before and after reform, and the *400% FPL* group are children whose family income is ≥400% of the FPL. Estimates adjusted by sex, age, time & state fixed effects, child's functional limitations/prescription use, perceived overall health, foreign/native born, family type, number of children in family, parent's highest education level, and type of Metropolitan/Core Based Statistical Area.

Chapter 5

Discussion

Two health reforms were evaluated as to whether they had any impact on disparities for access to care, utilization of care, and family financial burden among Hispanic children compared to NH-white children: the Massachusetts (MA) health reform law (Chapter 58) was implemented at the state-level (Chapter 2) and the Patient Protection and Affordable Care Act (ACA) was implemented at the national level (Chapter 3 & 4). The MA health reform was very similar to the ACA insurance reform, and furthermore, a model for which the ACA was based on. Each study aim utilized national datasets; the first utilized the National Survey of Children's Health (NSCH) and the second and third utilized the National Health Interview Survey (NHIS).

The first study aim in this dissertation (Chapter 2) examined long-term effects of the MA health reform on disparities in insurance access, utilization of care, and health status among Hispanic children compared to non-Hispanic white children. The main finding was that the Massachusetts (MA) Health Reform did significantly improve (narrow) disparities between Hispanic and NH-white children for consistent health insurance coverage, and insurance coverage disparities between these racial/ethnic groups were eliminated post reform. Unfortunately, no significant changes were detected for other health and healthcare indicators.

The second and third study aims (Chapters 3 & 4) evaluated the short-term impact of insurance reform through the ACA on disparities in insurance access, utilization of health care, and family financial burden due to medical costs among Hispanic children compared to non-Hispanic white children. The second study aim found that there were significant gains in insurance coverage and consistent coverage attributable to insurance expansion for both Hispanic

and NH-white children in the Medicaid/CHIP comparison group. However, there was no evidence of significant changes in racial/ethnic disparities in preventive care utilization due to reform. The third study aim used the same survey subjects of children in the NHIS as in the second aim and found that family financial burden disparities were not evident between Hispanic and NH-white children and their families. However, there was a significant reduction in high financial burden for both racial/ethnic groups in the Medicaid/CHIP comparison group post-ACA insurance reform. For both of the ACA studies, the insurance policy intervention "spilled over" into the Medicaid/CHIP comparison group, which had the most beneficial results. In sum, the ACA produced gains in insurance coverage and consistent coverage for children in the Medicaid/CHIP group, which may have contributed to reductions in high financial burden for those children and their families.

In the first study aim, insurance access disparities between Hispanic and NH-white children improved at the state-level for Massachusetts through the MA health reform, but not nationally as a result of insurance reform through the ACA. There are two notable policy differences that might have been instrumental in reducing disparities through the MA health reform but not the ACA. The first policy difference is health care expansion through Medicaid and subsidies. The ACA had a higher subsidy threshold (up to 400% FPL) than the MA Health Reform (up to 300% FPL). However, the MA Health reform was more generous at providing Medicaid up to 150% FPL, and children were covered by Medicaid or CHIP up to 300% FPL.[58] The ACA expanded Medicaid for adults with family incomes up to 130% FPL, and for children 0-19 years old, a minimum threshold at 138% FPL was set. After a Supreme Court ruling in 2012 allowed states to choose to expand Medicaid, 21 states did not expand Medicaid by 2015 and had a median income eligibility level of 45% FPL for parents, leaving almost 4 million

adults and parents uninsured and without affordable coverage options.[80] Nevertheless, CHIP captured children not eligible for Medicaid, and as 2015, all but 2 states covered children at 200% FPL to 400% FPL (19 states were at or above 300% FPL).[80,98]

Public insurance generosity from ACA insurance expansion efforts varied among U.S. states. Comparing 2010 uninsurance rates to 2015 rates, uninsurance among children was reduced on average by ~40% among states who expanded Medicaid compared to a ~30% average reduction in non-expansion states.[8] California, which expanded Medicaid and has the largest Hispanic population in the U.S., experienced the highest reduction in uninsurance among children overall (63% decrease).[8] Although insurance disparities between Hispanic and NH-white children were not evaluated between Medicaid expansion and non-expansion states, the impact could have mirrored the MA Health Reform findings among states with more generous coverage threshold, like California, which also has more generous eligibility policies for immigrant children.

The second difference between the MA Health Reform and the ACA that may have been instrumental in reducing disparities were eligibility policies for undocumented and documented immigrant residents. The ACA eligibility policies only allow U.S. citizens and qualified non-citizens (lawfully present immigrants who have been residents for five or more years) to benefit from Medicaid and subsidized insurance. The MA Health Reform extended coverage to all resident non-citizens in light of having a slightly larger proportion of immigrants in Massachusetts than the U.S. average (15% vs. 13%, respectively).[99] In the U.S., 35% of Hispanics residing in the U.S. are first generation immigrants compared to 8% of people who identify as non-Hispanic ethnicity.[100] Furthermore, 50% of uninsured non-elderly Hispanic

residents were non-citizens compared to only 3% among uninsured NH-white residents in 2016.[101]

The nonelderly uninsured Hispanic population has lower eligibility rates because they include a higher proportion of noncitizens who are not eligible to enroll in Medicaid/CHIP or subsidized insurance due to immigration status.[99,101] However, states have the option of removing the five-year waiting period for lawfully residing children for Medicaid/CHIP.[102] Children could enroll in Medicaid/CHIP without a five-year waiting period among the top fives states that had the highest reduction in uninsurance among children (California, Oregon, South Carolina, Colorado, and New Mexico).[8,102] In California, one study found strong evidence of a significant increase in public insurance coverage among Hispanic children in limited English proficiency families.[103] California also noted a spillover effect of increased Medicaid coverage among children, which is in line with the findings from the second and third study aims.[103]

A unique finding from this study is that improvements in child uninsurance and family financial burden from medical care were only evident among the Medicaid/CHIP comparison group, who were already Medicaid/CHIP eligible prior to insurance expansion through the ACA. Among children in the Medicaid/CHIP comparison group, 39% had a family income of <100% FPL and 41% had a family income of 100% FPL up to 200% FPL. The ACA had a significant impact on reducing uninsurance and improving consistent insurance coverage among Hispanic and NH-white children, and we see the greatest reduction in uninsurance among non-elderly adults for the same income groups. Among adults with incomes <100% FPL, uninsurance decreased from 39.3% in 2013 to 26.2% in 2016, and adults with incomes at 100% FPL to 138% FPL had the largest reduction in uninsurance compared to all other income groups from 40.6% to 24.6% in 2013 and 2016, respectively.[59,76] The findings, which are consistent with the literature,

suggest that many of the gains in insurance access were due to an increase in healthcare coverage among low-income populations.[31,59,76,96] Furthermore, previous studies have shown that children are more likely to gain coverage when parents gain coverage,[8,20] which would explain the "spill over" effect of the policy intervention among children who were already eligible for Medicaid/CHIP before insurance expansion through the ACA.

In line with these findings of improved insurance access among low-income children and adults is the significant impact of the ACA's insurance expansion efforts in reducing the proportion of families that experience high financial burden among Hispanic and NH-white children in the Medicaid/CHIP comparison group. We also see the greatest reduction in other financial burden measures among non-elderly adults eligible for Medicaid expansion. One study found that living in a Medicaid expansion state was associated with a reduction in uninsurance and a decline in out-of-pocket spending among non-elderly adults.[96] Third-party debt collection was reduced by approximately $1,140 among adults who lived in areas that were predominantly low-income and uninsured residents in Medicaid expansion states.[104] Increased insurance, less out-of-pocket spending, and less debt among low-income adults is consistent with improved insurance access and reduced family financial burden reported by parents of children in the Medicaid/CHIP group, especially since Medicaid expansion through the ACA increased income thresholds for parents whose children were already income eligible for Medicaid/CHIP prior to insurance reform.

Limitations. Although the differences between findings from the MA Health Reform and the ACA were discussed, direct comparisons cannot be made for several reasons. Massachusetts has a different economy and different population characteristics than the rest of the nation, and the MA and national health reform policies were enacted in different time periods. Although the

MA Health Reform and ACA analyses both used a quasi-experimental design (triple difference analyses), the counterfactuals were very different. The first study aim compared MA with surrounding New England states that did not have reform, whereas the second and third study aim did not have a comparison group where reform did not take place. The third study aim did select comparison groups that should not have been significantly impacted by reform. However, the policy treatment did "spill over" to one of the comparison groups, Medicaid/CHIP, which is a violation of conditions that must be met to be able to make causal inferences,[105] therefore these results should be interpreted with caution. The study did find that the best counterfactual for the intervention group was the 400% FPL group, for which the ACA had no impact on improving measures or disparities for these two treatment groups.

Conclusion

Although the MA Health Reform did see an improvement in consistent insurance access disparities between Hispanic and non-Hispanic white children, this study found insurance expansion efforts at the national-level through the ACA did not have the same outcome. However, impact from the ACA's insurance expansion efforts may differ for some states with more generous eligibility policies similar to those from the MA Health Reform. Since a greater proportion of Hispanic families are first generation immigrants compared to NH-white families, the ACA could have had a greater impact on children and their families who are income eligible for Medicaid/CHIP or insurance subsidies with the elimination of the five-year waiting period.[100,101] Results from both reform efforts did not yield improvements in utilization of healthcare; therefore other policy interventions in addition to insurance expansion are needed to improve preventive care disparities among children. The ACA did, however, improve family

financial burden from medical care among poor and near poor families, but no disparities were found between families with Hispanic and NH-white children. More research is needed to evaluate differences in utilization of care between Hispanic and NH-white families to evaluate why Hispanics who continue to experience higher uninsurance rates report similar levels of financial burden from medical care compared to NH-white families.

References

1. Howell EM, Kenney GM. The impact of the Medicaid/CHIP expansions on children: a synthesis of the evidence. *Med Care Res Rev*. 2012;69(4):372-396. doi:10.1177/1077558712437245.
2. Shone LP, Dick AW, Klein JD, Zwanziger J, Peter G, Szilagyi PG. Reduction in racial and ethnic disparities after enrollment in the State Children's Health Insurance Program. *Pediatrics*. 2005;115(6):e697-e705. doi:10.1542/peds.2004-1726.
3. Cohen RA, Martinez ME. *Health Insurance Coverage : Early Release of Estimates From the National Health Interview Survey, January-March 2013*. 2013;(September):1-21. http://www.cdc.gov/nchs/data/nhis/earlyrelease/insur201309.pdf.
4. Schoen C, Lippa J, Collins S, Radley D. *State Trends in Premiums and Deductibles, 2003 – 2011: Eroding Protection and Rising Costs Underscore Need for Action*. Vol 31.; 2012.
5. Auerbach BDI, Kellermann AL. A decade of health care cost growth has wiped out real income gains for an average US family. *Health Aff*. 2011;9(9):1630-1636.
6. Courtemanche CJ, Zapata D. Does universal coverage improve health? The Massachusetts experience. *J Policy Anal Manag*. 2014;33(1):36-69. doi:10.1002/pam.
7. McGuirea TG, Newhousea JP, Normanda S-L, Shia J, Zuvekas S. Assessing incentives for service-level selection in private health insurance exchanges. *NIH Public Access*. 2014;18(9):1199-1216. doi:10.1016/j.micinf.2011.07.011.Innate.
8. Garrett B, Gangopadhyaya A. Who gained health insurance coverage under the ACA , and where do they live ? 2016;(December).
9. Levy H, Meltzer D. The impact of health insurance on health. *Annu Rev Public Health*. 2008;29:399-409. doi:10.1146/annurev.publhealth.28.021406.144042.
10. Ben-shlomo Y, Kuh D. Editorial: A life course approach to chronic disease epidemiology : conceptual models, empirical challenges and interdisciplinary perspectives. *Int J Epidemiol*. 2002;31:285-293.
11. Smedley BD, Stith AY, Alan R. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academic Press (US); 2003.
12. Flores G, Laws MB, Mayo SJ, et al. Errors in medical interpretation and their potential clinical consequences in pediatric encounters. *Pediatrics*. 2003;111(1):6-14. doi:10.1542/peds.111.1.6.
13. Williams DR, American A, Wyatt R. Racial bias in health care and health challenges and opportunities. 2015;314(6):555-556.
14. Cohen RA, Ph D, Martinez ME, Interview H. *Health Insurance Coverage : Estimates from the National Health Interview Survey , 2005*. Hyattsville, Maryland; 2006. https://www.cdc.gov/nchs/nhis/releases.htm.
15. Cohen RA, Martinez ME. *Health Insurance Coverage : Early Release of Estimates From the National Health Interview Survey, 2011*. Hyattsville, Maryland; 2012. http://www.cdc.gov/nchs/nhis/releases. htm.
16. Newhouse JP, Manning WG, Morris CN, et al. Some interim results from a controlled trial of cost sharing in health insurance. *N Engl J Med*. 1981;305(25):1501-1507.
17. Flores G, Tomany-Korman SC. Racial and ethnic disparities in medical and dental health, access to care, and use of services in US children. *Pediatrics*. 2008;121(2):e286-98. doi:10.1542/peds.2007-1243.

18. Manning WG, Newhouse JP, Duan N, Keeler EB, Leibowitz A, Marquis MS. Health insurance and the demand for medical care: Evidence from a randomized experiment. *Am Econ Rev*. 1987;77(3):251-277.
19. Remler DK, Greene J. Cost-sharing: A blunt instrument. *Annu Rev Public Health*. 2009;30:293-311. doi:10.1146/annurev.publhealth.29.020907.090804.
20. DeVoe JE, Marino M, Angier H, et al. Effect of expanding medicaid for parents on children's health insurance coverage. *JAMA Pediatr*. 2015;169(1):e143145. doi:10.1001/jamapediatrics.2014.3145.
21. Data Resource Center for Child and Adolescent Health. http://www.childhealthdata.org.
22. Haas S a, Glymour MM, Berkman LF. Childhood health and labor market inequality over the life course. *J Health Soc Behav*. 2011;52(3):298-313. doi:10.1177/0022146511410431.
23. Miller S. The impact of the Massachusetts health care reform on health care use among children. *Am Econ Rev*. 2012;102(3):502-507. doi:10.1257/aer.102.3.502.
24. Kenney GM, Long SK, Luque A. Health reform in Massachusetts cut the uninsurance rate among children in half. *Health Aff (Millwood)*. 2010;29(6):1242-1247. doi:10.1377/hlthaff.2010.0314.
25. Avila RM, Coe N. The Massachusetts health reform and children's health: Can we achieve health and health care equity among all children? (Poster Presentation). *Popul Assoc Am 2014 Annu Meet*.
26. Barnett BJC, Vornovitsky MS, Davis KE, et al. *Health Insurance Coverage in the United States : 2015 Current Population Reports*. Vol 257.; 2016.
27. Cohen RA, Zammitti EP, Martinez ME. *Health Insurance Coverage: Early Release of Estimates From the National Health Interview Survey, 2016*. Hyattsville, Maryland; 2017.
28. Spencer DL, McManus M, Thiede K, et al. Health care coverage and access among children, adolecscents, and yong adults, 2010-2016: Implications for Future Health Reforms. *J Adolesc Heal*. 2018;62(6):667-673. doi:10.1016/j.jadohealth.2017.12.012.Health.
29. Feldman HM, Buysse CA, Hubner LM, Huffman LC, Loe IM. Patient protection and Affordable Care Act of 2010 and children and youth with special health care needs. 2015;36(3):207-217.
30. Abdus S, Mistry KB, Selden TM. Racial and ethnic disparities in services and the Patient Protection and Affordable Care Act. *Am J Public Health*. 2015;105(S5):S668-S675. doi:10.2105/AJPH.2015.302892.
31. Courtemanche C, Marton J, Ukert B. The three- -year impact of the Affordable Care Act on disparities in insurance coverage. 2016;(Ddd):1-10. doi:10.1111/1475-6773.13077.
32. Scott JW, Salim A, Sommers BD, Tsai TC, Scott KW, Song Z. Racial and Regional disparities in the effect of the Affordable Care Act's dependent coverage provision on young adult trauma patients. *J Am Coll Surg*. 2015;221(2):495-501.e1. doi:10.1016/j.jamcollsurg.2015.03.032.
33. Ortega AN, Mckenna RM, Chen J, Alcala EE, Langellier BA, Roby DH. Insurance coverage and well-child visits improved for youth under the Affordable Care Act, but latino youth still lag behind. *Acad Pediatr*. 2017:1-8. doi:10.1016/j.acap.2017.07.006.
34. Velasco-mondragon E, Jimenez A, Palladino-davis AG, Davis D, Escamilla-cejudo JA. Hispanic health in the USA: A scoping review of the literature. *Public Health Rev*. 2016:1-27. doi:10.1186/s40985-016-0043-2.

35. Avila RM, Bramlett MD. Language and immigrant status effects on disparities in Hispanic children's health status and access to health care. *Matern Child Health J*. April 2012. doi:10.1007/s10995-012-0988-9.
36. Gruber J. The incidence of mandated maternity benefits. *Am Econ Rev*. 1994;84(3):622-641. http://www.ncbi.nlm.nih.gov/pubmed/10134748.
37. Newton HJ, Baum CF, Beck N, et al. The Stata Journal. *Stata J*. 2010;10(2):305-308.
38. Shadish WR, Cook TD, Campbell DT. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Cengage Learning; 2003.
39. National Center for Health Statistics. *Survey Description, National Health Interview Survey, 2013*. Hyattsville, Maryland; 2014. ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/2013/srvydesc.pdf.
40. Blumberg SJ, Foster EB, Frasier AM et al. Design and Operation of the National Survey of Children ' s Health , 2007. *Natl Cent Heal Stat Vital Heal Stat*. 2012;1(55).
41. Dressler WW, Oths KS, Gravlee CC. Race and ethnicity in public health reseach: Models to explain health disparities. *Annu Rev Anthropol*. 2005;34(1):231-252. doi:10.1146/annurev.anthro.34.081804.120505.
42. Williams R. Race and health: Basic questions, emergin directions. *Ann Epidemiol*. 1997;2797(9):322-333.
43. Williams DR, Neighbors HW, Jackson JS. Racial/ethnic discrimination and health: Findings from community studies. *Racial/Ethnic Bias Heal*. 2003;93(2):200-208.
44. Myers HF. Ethnicity- and socio-economic status-related stresses in context: an integrative review and conceptual model. *J Behav Med*. 2009;32(1):9-19. doi:10.1007/s10865-008-9181-4.
45. Williams DR. Miles to go before we sleep: Racial inequities in health. *J Health Soc Behav*. 2012;53(3):279-295. doi:10.1177/0022146512455804.
46. Dominguez TP. Race, racism, and racial disparities in adverse birth outcomes. *Clin Obstet Gynecol*. 2008;51(2):360-370. doi:10.1097/GRF.0b013e31816f28de.
47. Baluja KF, Park J, Myers D. Inclusion of immigrant status in smoking prevalence statistics. 2003;93(4):642-646.
48. Gallo LC, Penedo FJ, Espinosa De Los Monteros K, Arguelles W. Resiliency in the face of disadvantage: Do hispanic cultural characteristics protect health outcomes? *J Pers*. 2009;77(6):1707-1746. doi:10.1111/j.1467-6494.2009.00598.x.
49. Smith AJ, Chien AT. Massachusetts health reform and access for children with special health care needs. *Pediatrics*. 2014;134(2):218-226. doi:10.1542/peds.2013-3884.
50. Leibowitz A, Manning WG, Keeler EB, Duan N, Lohr KN, Newhouse JP. Effect of cost-sharing on the use of medical services by children: interim results from a randomized controlled trial. *Pediatrics*. 1985;75(5):942-951.
51. Baicker K, Finkelstein A. The effects of Medicaid coverage-learning from the Oregon experiment. *N Engl J Med*. 2011;365(8):683-685. doi:10.1056/NEJMp1108222.
52. Rodriguez HP, von Glahn T, Grembowski DE, Rogers WH, Safran DG. Physician effects on racial and ethnic disparities in patients' experiences of primary care. *J Gen Intern Med*. 2008;23(10):1666-1672. doi:10.1007/s11606-008-0732-8.
53. van Ryn M, van Ryn M, Burke J, Burke J. The effect of patient race and socio-economic status on physicians' perceptions of patients. *Soc Sci Med*. 2000;50(6):813-828. doi:10.1016/S0277-9536(99)00338-X.

54. Lee YY, Lin JL. The effects of trust in physician on self-efficacy, adherence and diabetes outcomes. *Soc Sci Med*. 2009;68(6):1060-1068. doi:10.1016/j.socscimed.2008.12.033.
55. Szilagyi PG, Dick AW, Klein JD, Shone LP, Zwanziger J, Mcinerny T. Improved access and quality of care after enrollment in the New York State Children' s Health Insurance Program (SCHIP). *Pediatrics*. 2015;113(5).
56. Howell E, Decker S, Hogan S, Yemane A, Foster J. Declining child mortality and continuing racial disparities in the era of the Medicaid and SCHIP insurance coverage expansions. *Am J Public Health*. 2010;100(12):2500-2506. doi:10.2105/AJPH.2009.184622.
57. Fox MH, Moore J, Davis R, Heintzelman R. Changes in reported health status and unmet need for children enrolling in the Kansas Children's Health Insurance Program. *Am J Public Health*. 2003;93(4):579-582. doi:10.2105/AJPH.93.4.579.
58. Kaiser Family Foundation. *Massachusetts Health Care Reform: Six Years Later.*; 2012.
59. Cohen RA, Martinez ME. Health Insurance Coverage : Early Release of Estimates From the National Health Interview Survey, 2013. *Natl Cent Heal Stat*. 2014;June:1-42.
60. Currie J, Gruber J. Health insurance eligibility, utilization of medical care, and child health. *Q J Econ*. 1996;111(2):431-466.
61. Currie J, Gruber J. Saving babies: The efficacy and cost of recent changes in the Medicaid eligibility of pregnant women. *J Polit Econ*. 1996;104(6):1263-1296. doi:10.1086/262059.
62. The Child and Adolescent Health Measurement Initiative. The Data Resource Center for Child & Adolescent Health: Interactive Data Query. http://www.childhealthdata.org/browse/survey. Accessed October 10, 2017.
63. U.S. Department of Health and Human Services. *US Department of Health and Human Services. The Health and Well-Being of Children: A Portrait of States and the Nation, 2011-2012.*; 2014.
64. Maxwell J, Cortés DE, Schneider KL, Graves A, Rosman B. Massachusetts' health care reform increased access to care for Hispanics, but disparities remain. *Health Aff (Millwood)*. 2011;30(8):1451-1460. doi:10.1377/hlthaff.2011.0347.
65. McPherson M, Arango P, Fox H, et al. A new definition of children with special health care needs. *Am Acad Pediatr*. 1998;102(1):137-140.
66. Bethell CD, Read D, Stein REK, Blumberg SJ, Wells N, Newacheck PW. Identifying children with special health care needs: development and evaluation of a short screening instrument. *Ambul Pediatr*. 2002;2(1):38-48. http://www.ncbi.nlm.nih.gov/pubmed/11888437.
67. Hebert PL, Sisk JE, Howell EA. When does A difference become a disparity? conceptualizing racial and ethnic disparities in health. :374-382. doi:10.1377/hlthaff.27.2.374.
68. Dubay L, Guyer J, Mann C, Odeh M. At the intersection of health, health care and policy. 2007;26(2):370-381. doi:10.1377/hlthaff.26.2.370.
69. Federico SG, Steiner JF, Beaty B, Crane L, Kempe A. Disruptions in insurance coverage: patterns and relationship to health care access, unmet need, and utilization before enrollment in the State Children's Health Insurance Program. *Pediatrics*. 2007;120(4):e1009-e1016. doi:10.1542/peds.2006-3094.
70. Leininger LJ. Partial-year insurance coverage and the health care utilization of children. *Med Care Res Rev*. 2009;66:49-67. doi:10.1177/1077558708324341.
71. Racine AD, Long TF, Helm ME, et al. Children's Health Insurance Program (CHIP):

accomplishments, challenges, and policy recommendations. *Pediatrics*. 2014;133(3):e784-93. doi:10.1542/peds.2013-4059.
72. Georgetown Center for Children and Families and Center on Budget and Policy Priorities. *The Maintenance of Effort (MOE) Provision in the Affordable Care Act*.; 2017.
73. Kaiser Family Foundation. *Summary of New Health Reform Law*. OECD Publishing; 2011. doi:10.1787/9789264122314-en.
74. Galer-Unti R a. The patient protection and Affordable Care Act: Opportunities for prevention and advocacy. *Health Promot Pract*. 2012;13(3):308-312. doi:10.1177/1524839912438750.
75. FamiliesUSA.org. A 50-state look at Medicaid expansion. http://familiesusa.org/product/50-state-look-medicaid-expansion. Published 2015.
76. Clarke TC, Norris T, Schiller JS. Early Release of Selected Estimates Based on Data From the 2016 National Health Interview Survey. *Natl Heal Interview Surv*. 2017;May:1-120. http://www.cdc.gov/nchs/nhis.htm.%0APage.
77. National Center for Health Statistics. *Survey Description, National Health Interview Survey, 2015*. Hyattsville, Maryland; 2016.
78. Kaiser Family Foundation's Program on Medicaid and the Uninsured. State health facts, Medicaid/CHIP upper income eligibility limits for children, 2000-2018.
79. Gould W. Stata Vol 14. 2014.
80. Brooks T, Touschner J, Artiga S, Stephens J, Gates A. *Modern Era Medicaid: Findings from a 50-State Survey of Eligibility, Enrollment, Renewal, and Cost-Sharing Policies in Medicaid and CHIP as of January 2015*.; 2015.
81. Child Trends. Immigrant Children: Indicators of Child and Youth Well-Being. *Data Bank*. 2014;(October).
82. Cavazos-rehg PA, Zayas LH, Spitznagel EL. Legal Status , Emotional Well-Being and Subjective Health Status of Latino Immigrants. 2007;99(10).
83. Kirzinger A, Hamel L, DiJulio B, Munana C, Brodie M. Kaiser Health Tracking Poll – October 2017 : Experiences of the Non- Group Marketplace Enrollees. *Kaiser Fam Found*. 2018;(October 2017):1-20.
84. LAI KKR, Parlapioano A. Millions Pay the Obamacare Penalty Instead of Buying Insurance. Who Are They? *The New York Times*. https://nyti.ms/2icKCDQ.
85. Weech-Maldonado R, Elliott MN, Oluwole A, Schiller KC, Hays RD. Survey response style and differential use of CAHPS rating scales by Hispanics. *Med Care*. 2008;46(9):963-968. doi:10.1097/MLR.0b013e3181791924.
86. Clarke III I. Extreme Response Style in Cross-Cultural Research: An Empirical Investigation. *J Soc Behav Pers*. 2000;15(1):137-152. doi:10.1177/002202217400500407.
87. Ortega AN, Fang H, Perez VH, et al. Health care access, use of services, and experiences among undocumented Mexicans and other Latinos. *Arch Intern Med*. 2007;167(21):2354-2360. doi:10.1001/archinte.167.21.2354.
88. Himmelstein DU, Thorne D, Warren E, Woolhandler S. Medical bankruptcy in the United States , 2007: Results of a national study. *AJM*. 2009;122(8):741-746. doi:10.1016/j.amjmed.2009.04.012.
89. Claxton G, DiJulio B, Finder B, Becker E. *Employer Health Benefits 2007 Annual Survey*. Menlo Park, CA; 2007.
90. Galbraith AA, Wong ST, Kim SE, Newacheck PW. Child health out-of-pocket financial burden for low-income families with children : Socioeconomic disparities and effects of

insurance. 2005:1722-1736. doi:10.1111/j.1475-6773.2005.00421.x.
91. Paez KA, Zhao L, Hwang W. Rising out-of-pocket spending for chronic conditions: A ten-year trend. *Health Aff*. 2009;28(1):15-25. doi:10.1377/hlthaff.28.1.15.
92. Kuhlthau K, Hill KS, Yucel R, Perrin JM. Financial burden for families of children with special health care needs. *Matern Child Health J*. 2005;9(2):207-218. doi:10.1007/s10995-005-4870-x.
93. Gross T, Notowidigdo MJ. Health insurance and the consumer bankruptcy decision: Evidence from expansions of Medicaid. *J Public Econ*. 2011;95(7-8):767-778. doi:10.1016/j.jpubeco.2011.01.012.
94. Wisk LE, Gangnon R, Vanness DJ, Galbraith A a., Mullahy J, Witt WP. Development of a Novel, Objective Measure of Health Care-Related Financial Burden for U.S. Families with Children. *Health Serv Res*. 2014:n/a-n/a. doi:10.1111/1475-6773.12248.
95. Graubard BI, Korn EL. Predictive margins with survey data. *Biometrics*. 1999;55(2):652-659. http://www.ncbi.nlm.nih.gov/pubmed/11318229.
96. Blavin BF, Karpman M, Kenney GM, Sommers BD. Medicaid versus marketplace coverage for near-poor adults: Effects on out-of-pocket spending and coverage. 2010:299-307. doi:10.1377/hlthaff.2017.1166.
97. Guerrero AD, Zhou X, Chung PJ. How Well is the Medical Home Working for Latino and Black Children ? *Matern Child Health J*. 2018;22(2):175-183. doi:10.1007/s10995-017-2389-6.
98. Rudowitz R, Artiga S, Arguello R. *Children's Health Coverage: Medicaid, CHIP and the ACA*.; 2014.
99. Joseph TD. What health care reform means for immigrants: Comparing the Affordable Care Act and Massachusetts Health Reforms. *Jounal Heal Polit Policy Law*. 2016;41(1):101-116. doi:10.1215/03616878-3445632.
100. Trevelyan E, Gambino C, Gryn T, et al. *Characteristics of the U.S. Population by generational status: 2013 Current Population Survey Reports*. Washington, DC; 2016. https://www.census.gov/content/dam/Census/library/publications/2016/demo/P23-214.pdf.
101. Artiga S, Foutz J, Damico A. *Health Coverage by Race and Ethnicity : Changes Under the ACA*.; 2018.
102. *Health Coverage for Lawfully Residing Children*. Washington, DC; 2018. https://ccf.georgetown.edu/wp-content/uploads/2018/05/ichia_fact_sheet.pdf.
103. Sommers BD, Chua K, Kenney GM, Long SK, Mcmorrow S. California's early coverage expansion under the Affordable Care Act: A county-level analysis. *Heatlh Serv Res*. 2015;June:825-845. doi:10.1111/1475-6773.12397.
104. Hu L, Kaestner R, Mazumder B, Miller S, Wong A. The effect of the affordable care act Medicaid expansions on fi nancial wellbeing ☆. *J Public Econ*. 2018;163:99-112. doi:10.1016/j.jpubeco.2018.04.009.
105. Ryan AM, Jr JFB, Dimick JB. Why we should not be indifferent to specification choices for difference-in-differences. 2009. doi:10.1111/1475-6773.12270.