

**Understanding the Association Between Child Development Screening Results and Race
and Nativity Among Early Head Start Enrollees in Allegheny County**

by

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University of Pittsburgh, 2020

Abstract

Background: Poverty and its negative health effects are pervasive in early childhood, affecting nearly one in five children under five, and are particularly stark for children of color and immigrant children. Public health and education efforts to promote equity at this critical stage of development often remain siloed, despite evidence for access to quality early childhood education as a strategy to promote public health for young children and their families.

Methods: This study assessed the enrollment patterns of children at an Early Head Start provider in Allegheny County by race and nativity between February 2019 and February 2020. Additionally, it compared children's results on a developmental screener six months after program entry by child race.

Results: Analysis of one Early Head Start (EHS) program in Allegheny County (n = 465 enrollees during study period; n = 266 enrolled for at least 6 months) showed that, despite all children meeting EHS eligibility criteria, there are significant differences in children's family contexts and how they enroll and participate in EHS by race and nativity. For example, immigrant children participate in home-based EHS at a higher rate than their non-immigrant peers (p = <0.001). Analysis of children's developmental screening scores also indicated a disparity between multiracial children and Black children in personal-social development (OR = 3.14, p = 0.03).

Conclusions: Early Head Start is one program that provides access to quality early childhood education for children living in poverty, who are disproportionately children of color and immigrant children. As such, it provides a promising avenue for integrating equity-based

research and pedagogy more fully into its programming. These findings can help EHS practitioners think more broadly about how they interpret the existing demographic data they collect on their enrolled families and what it may tell them about how and why families choose to participate in EHS. Early childhood is a critical stage for prevention and intervention and improving access to quality early childhood education is one component of reducing public health inequities in this stage and across the life course.

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Preface

This research grew out of my University of Pittsburgh Graduate School of Public Health practicum based at the Council of Three Rivers American Indian Center's Early Head Start office. I am incredibly grateful to Debbie Gallagher, Pam Dickinson, and Holly Santry at COTRAIC for their mentorship and facilitation over the course of my practicum and this project. I would also like to recognize the other COTRAIC staff, those at COTRAIC partnership sites, and my practicum partner Kathleen; their knowledge and passion for caring for children was inspiring. Finally, I wish to thank the families enrolled in COTRAIC's EHS program for allowing me to come into their homes and childcare centers, spend time with them and their children, and learn how EHS has benefitted them directly.

I want to recognize my committee member, Dr. Thistle Elias, for her support both in the classroom as an instructor for the Health Equity certificate and as the director of the Bridging the Gaps program, through which my practicum was facilitated. I also wish to thank Dr. Klaus Libertus, whose Infancy class in the Psychology department broadened my understanding of child development and without whom this thesis would have suffered in interpreting the results and putting them into context. Finally, I would like to thank my advisor and committee chair Dr. Tiffany Gary-Webb, who has continuously supported me throughout my MPH studies and is a truly wonderful example of what fighting for health equity looks like.

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1.0 Introduction

When considering health and education from a life course perspective, early childhood is a critical stage for prevention and intervention, forming the basis of a child's social, emotional, cognitive, and physical development. However, poverty has been shown to have to have negative health impacts that cause disparities in childhood development and persist through adulthood, including higher rates of learning disabilities, higher rates of childhood asthma, and increased risk of hypertension and diabetes in adulthood¹⁻³. Poverty is pervasive in early childhood. Nationally, nearly 1 in 5 households with children under five live in poverty (as defined by the Office of Management and Budget) compared to 1 in 10 households overall^{4,5}. This pattern is replicated here in Allegheny County^{4,5}.

Additionally, children of color and first and second generation immigrant children are more likely to experience poverty and its associated adverse health effects than their white, non-immigrant counterparts due to structural systems of exclusion⁶⁻⁸. While nationally only 16% of White children under five live in poverty, 36% of Black children, 36% of American Indian and Alaskan Native children, 23% of multiracial children, and 23% of children with at least one foreign-born parent do^{5,9}. Racial disparities are magnified even further in Allegheny County. Only 9% of White children under five in the county live in poverty, compared to 46% of Black children, 38% of multiracial children, and 15% of children with at least one foreign-born parent^{5,9}.

Policies and programs that reduce inequities in early childhood help promote health equity throughout the life course. In 2016, the Community Preventive Services Task Force (CPSTF) conducted a systematic review that identified access to quality, center-based early childhood education (ECE) programs as a way to promote health and educational equity¹⁰. This thesis will

explore the current state of the literature linking access to ECE, inequities based on race and immigration status, and health outcomes. This analysis will serve as the basis for understanding how ECE programs and the communities in which they are located can better serve families of color and immigrant families here in Allegheny County.

Despite the CPSTF recommendation for access to ECE, there are many barriers that limit this access, particularly for families of color and immigrant families. The cost of care continues to rise – in 2017, the average cost for childcare in Pennsylvania was \$987 per month for infants and \$814 per month for 4-year-olds¹¹. For families living in poverty, costs as a share of income far outpace the Department of Health and Human Services’ recommendation that childcare is affordable if it comprises less than 7% of the family budget; even for median-income Pennsylvanian families these costs comprise 17.5% of their income^{11,12}.

There are in turn stark differences in how young children receive care at the intersections of race, nativity, and socioeconomic status. Although use of non-parental care overall is relatively similar across races and ethnicities, Black children aged three to five are more likely to attend full-day, center-based preschool programs compared to their peers while Hispanic children from birth to six are less likely to attend center-based care of any duration compared to their peers^{13,14}. Immigrant families are less likely to rely on non-parental care compared to non-immigrant families and when they do use non-parental care, they are more likely to use the care of other relatives¹⁵.

There are a variety of structural factors that affect these differences in ECE access and use. For example, complex income eligibility rules and work requirements for public programs disproportionately impact families of color, who are disproportionately un- and underemployed in the low-wage workforce and caregivers who are non-native English speakers¹⁵. Employment

patterns in the low-wage workforce also mean that families often require care during nontraditional hours, a feature that is not offered by most ECE providers¹⁵.

There are also differences in the quality of centers that children of color attend, using both traditional measures of quality and considering what equitable ECE curriculums look like more broadly. Analysis of state-funded preschool programs in 26 states, not including Pennsylvania, by The Education Trust found that only 4% of Black children and 1% of Latino children attended a program in a state whose program standards met the National Institute for Early Education Research's (NIEER) requirements for "high quality"¹⁶. NIEER's measures include programs having lower child-teacher ratios, higher levels of teacher education, and the use of continuous quality improvement systems¹⁶. While The Education Trust's analysis was conducted at the state level, this disparity persists for Black children at the childcare center level, with Black children more likely to attend medium or low quality Head Start programs compared to their peers¹⁷.

Additionally, the "definitions of quality in early childhood settings often reflect the views of the dominant language and culture and may fail to elevate standards on diversity or alternative concepts of quality"¹⁵. While there are some ECE models that emphasize the importance of centering families of color and immigrant families within ECE programming, they are not cohesive and require sustained efforts from policymakers and practitioners to put into practice^{15,18}. Under the dominant, White-centric ECE system, children of color are disproportionately disciplined, disrupting their access to early education, which can have cascading effects on their future health and development^{15,19}. Incorporating measures of quality that center equity pedagogy is crucial to building an equitable ECE system¹⁸.

Two related programs that are designed to reduce early childhood inequities and have the potential to incorporate equity pedagogy are Head Start (HS) and Early Head Start (EHS). Head

Start and Early Head Start [(E)HS] are federal programs that provide free access to high quality early childhood education from birth to age five for children whose families live below the poverty line²⁰. Early Head Start (EHS) serves children from birth to three while Head Start serves children from three to five²⁰. Currently, (E)HS's approach to serving children from diverse backgrounds is guided by Multicultural Principles for Early Childhood Leaders, which emphasizes ensuring the families served by each center are represented in its programming, supporting dual language learners, and challenging individual and institutional biases²¹. Additionally, (E)HS's program standards regarding the learning environment include provisions for dual language learners²². As a long-standing and wide-reaching program, (E)HS offers an opportunity to understand how its services currently serve young children and to discover how its framework can be leveraged to further promote health equity beyond its existing efforts.

The second chapter of this thesis will review the history of (E)HS, the existing literature on how ECE access and outcomes vary by race and nativity, and the role of (E)HS eligibility and use in promoting health equity, particularly among children of color and immigrant children. The third chapter is a stand-alone journal article that has not been submitted for publication as of August 2020 examining the relationship between race and nativity and child development outcomes for children enrolled in EHS through an Allegheny County EHS provider. Following this article are the thesis conclusions.

2.0 Background and Literature Review

2.1 History of Head Start and Early Head Start

2.1.1 Head Start

Head Start was founded in 1965 as one of President Lyndon B. Johnson's "Great Society" programs – programs created to eliminate poverty through the provision of government social welfare services across all sectors of society²³. Head Start provides education, health, and family support services to children aged three to five living in poverty through a variety of service models, though most are based in centers and schools²⁰. Head Start has served more than 30 million children since its inception and in 2019 served more than 775,000 children nationwide and more than 4000 children in Allegheny County^{23,24}. Head Start also offers specialized programming for children of migrant farmworkers and American Indian and Alaskan Native children that center the cultural practices of the communities in which they are based, dual language learners, and non-standard work schedules²⁵.

Although Head Start is now a wide-reaching federal program, it is important to acknowledge Head Start's roots within the Civil Rights Movement, a legacy that affects the racial makeup of the program to this day. Head Start was widely adopted by Black organizers in Mississippi during the program's 1965 summer demonstration project. The initial announcement of Head Start funding offered a way for community activists to receive federal funds directly, a particularly important feature for interested Black communities in the Jim Crow south¹⁵. However, the federal government also sought to stymie the influence of Freedom Movement organizers on

Head Start programs in Mississippi and beyond. The original organization through which Mississippi's Head Start programs were organized was forced to dissolve in 1968 in favor of biracial, moderate community boards, while federal Head Start policy continued to be guided by the work of white policymakers, particularly the Moynihan Report, which traced the roots of Black poverty to the social conditions within Black families and communities²⁶.

However, even from the outset, federal guidelines offered considerable leeway to programs in making implementation decisions, a feature that is retained to this day. After funding for the summer was announced in early 1965, organizers leveraged Freedom Movement networks to build infrastructure necessary to run their programs as white school boards and business owners were unwilling to work with them²⁶. More than 21,000 children received Head Start services in Mississippi during the 1965 summer demonstration project²⁶.

From the beginning, Mississippian Head Start teachers saw the program's potential for supporting community wellbeing, not just that of children they were teaching, holding child health screenings after school in rural communities, hiring teachers regardless of educational attainment and sponsoring their training courses, and engaging with families and fellow community organizers, such that they organized to demand the program continue to be funded after its initial pilot²⁶. Centers also developed a curriculum that centered Black history and consciousness in 1968 drawn from the principles developed with older children in Mississippi's Freedom Schools²⁶. It is important to acknowledge this legacy in tandem with top-down, "War on Poverty" narratives of Head Start's history presented by Head Start itself in order to conceptualize how local practitioners have and continue to implement programming in and for their communities and how these programs can continue to promote health equity.

2.1.2 Early Head Start

In 1994, Head Start expanded significantly, including the creation of Early Head Start (EHS), which applies the principles and goals of Head Start to children from birth to three, as well as people who are pregnant²³. Far fewer children are served by EHS compared to Head Start – in 2019, 231,000 children nationwide and more than 1100 children in Allegheny County received EHS services²⁴.

2.1.3 Head Start and Early Head Start Evaluation and Research

As a government program, the bulk of research surrounding Head Start and Early Head Start comes from federal government reports and evaluations as well as think tanks and non-profits that work closely with the government to implement and evaluate Head Start programming. Federal reports regarding programmatic aspects of (E)HS are regular, comprehensive, and publicly accessible. Yearly Program Information Reports provide information about enrollees, their families, and the types of services they receive, down to the grantee level²⁴. Since 1997, the Administration for Children and Families' Office of Planning, Research, and Evaluation (OPRE) has also conducted studies of child, family, and staff experiences in (E)HS, called FACES and Baby FACES (Family and Child Experiences Survey) for Head Start and Early Head Start, respectively^{27,28}. OPRE also conducts a variety of other comprehensive evaluations and research on (E)HS outcomes.

However, non-profits and think tanks are often the ones to conduct evaluation of longer-term outcomes on behalf of the Office of Head Start as well as explicitly incorporate equity into

their evaluations^{15,29–31}. This system of research and evaluation leads to several issues that hinder researchers' and practitioners' understandings of how (E)HS can be used to promote health equity.

The bulk of (E)HS research occurs at the federal level, where there is a massive amount of data, resulting in lengthy analyses – the most recent FACES report regarding child development outcomes was published in 2018 using data from the children enrolled in 2014-2015, while the most Baby FACES report was published in 2015 with data from children born in 2009^{27,28}. At the state level, research is even more difficult to access; the Pennsylvania Head Start Association links to just one study of a Harrisburg-area Head Start program in 2003-2004³². Additionally, when the majority of research comes from the federal government and non-profit or think tank reports rather than peer-reviewed literature, this is challenging for researchers as the research remains diffuse, not indexed for fellow researchers, and not reviewed by outside scholars for research quality. This pattern also makes it difficult to compare how (E)HS participation and experiences compare to children who receive other forms of care. The following sections will explore how equity has been addressed in ECE research and evaluation beyond (E)HS programs, particularly when investigating how ECE access impacts health.

2.2 Early Childhood Education to Promote Health Equity

Access to quality, center-based ECE has been linked to improvements in health and development both during and following enrollment. The Community Preventive Services Task Force's (CPSTF) systematic review found beneficial effects based on standardized test scores, graduation rates, and self-regulation for low-income children who participated in ECE programs¹⁰. Participation in center-based ECE has been linked to both direct (e.g. screenings, nutrition, health

promoting activities) and indirect (e.g. increased caregiver resources due to more time in employment) health benefits³³. It is important to highlight the positive impact of Head Start and Early Head Start in this area, as they explicitly integrate nutrition and health services into their programming³³. Participation in ECE has also been linked to clinical health benefits through adolescence, including lower blood pressure and cortisol levels³⁴.

Despite these associations, there is still significant siloing between the health and ECE fields as researchers explore the systemic roots of disparities in early childhood health and education. In a systematic review evaluating the intersection of health and education to address school readiness, the authors describe child poverty as “independent and additive” – poverty negatively and independently affects both health and school readiness, as well as access to quality education³⁵. Given that poverty disproportionately impacts children of color and immigrant children, it is important to understand how these factors also play a role in children’s early care experiences and their health and development outcomes.

2.3 Race in Early Childhood Health and Education Research

Untangling the relationship between poverty, race, health and development, and education in early childhood represents a significant challenge in understanding and addressing disparities in ECE. This section of the review will assess the current literature around racial disparities in ECE access and use, and its longer-term impacts on health and wellbeing.

Black, Indigenous, and multi-racial children of color experience poverty at greater rates than their peers of other races and are therefore in particular need of support throughout early childhood⁵. OPRE and other researchers, primarily using the Early Childhood Longitudinal Study

– Birth Cohort (ECLS-B), routinely investigate and describe disparities in early childhood experiences of poverty, access to childcare, and health outcomes. The ECLS-B is a nationally representative, longitudinal study of approximately 14,000 children born in the United States in 2001 that followed children from birth until kindergarten entry³⁶. During each round of data collection, children participated in assessment activities, caregivers were surveyed about themselves, their children, and their families, and children’s education providers were surveyed if the child participated in ECE³⁶. This reliance on one main data source for analyses creates barriers for understanding how experiences vary across time and space, especially as the cohort ended in 2007.

Only a few articles in the recent literature have addressed ECE disparities by race and ethnicity and fewer still have explicitly addressed the potential health implications of these disparities. Additionally, when looking at them from a health disparities research lens, most fall squarely within the lower levels of the framework described by Thomas et al. in their analysis by describing and understanding disparities or just begin to get at potential policy solutions³⁷. Reports from OPRE on FACES and Baby FACES merely describe enrollment statistics, family characteristics such as maternal depression and economic stress, and child development outcomes by race^{27,28}. Beyond OPRE, mixed-effects models suggest moderate support for both center- and home-based Early Head Start for Black and Hispanic children³⁸. Latino children are underrepresented in non-parental care compared to their non-Latino counterparts, though these disparities are often eliminated when controlling for factors such as maternal education, income, and maternal employment³⁹. When examining the impact of race on developmental outcomes, studies have found disparities emerging between White children and children of color by nine months and increasing through 24 months as well as emerging by 24 months for Black boys, even

when controlling for other demographic and family characteristics^{40,41}. Beginning to explore potential policy avenues, data from the ECLS-Kindergarten cohort in the late 1990s indicates the potential academic benefits of ECE participation for Black and Hispanic children in particular and promotes the push comprehensive, rather than incremental, expansion in both enrollment and quality⁴².

There is also a small body of research that has examined the potential mechanisms for these disparities beyond the interaction between poverty and race. A study of the impact of EHS on Black children in its early years of implementation looked at its impacts beyond academic measures, including improvements to sustained attention and engagement with parents in play, primarily through the pathways of parental supportiveness and parental cognitive stimulation⁴³. Similarly, others have discussed the relative primacy of research that focuses primarily on the potential academic or “school readiness” gains of Head Start compared to other outcomes such as language acquisition and effects on parents, despite evidence that most academic gains fade out within several years⁴⁴. At the family and community level, research has demonstrated support for contextual factors including neighborhood racial/ethnic makeup, work participation, and economic factors that result in low participation formal ECE by Hispanic families but not Black families⁴⁵.

Several authors, a mix of peer-reviewed researchers and those from think tanks, address the role of race, health, and ECE and potential policy avenues to promote health equity more explicitly. Disparate access to (E)HS and federal ECE subsidies by race varies considerably from state to state, and EHS-eligible children are particularly underserved³⁰. Given the high costs of care for children under three compared to older children, access to high quality, affordable care is particularly important for children in this age group⁴⁶. Additionally, funding patterns have not kept pace with demographic shifts, particularly in the southwest, which has seen stagnant (E)HS

funding despite rapidly increasing child populations, particularly Hispanic children³⁰. A tool from several social policy researchers at Brandeis University called the Policy Equity Assessment goes beyond looking at effectiveness to integrate equity into all steps of policy analysis³¹. The assessment emphasizes the importance of examining the logic, capacity, and evidence for a policy to reduce inequities. For example, Head Start is not explicitly designed to reduce racial inequities, it has had positive impacts on Black and Hispanic enrollees in particular, though there are still improvements to be made, particularly regarding the under-enrollment of Hispanic children and in the disproportionate enrollment of Black children in low-quality centers compared to their White peers³¹.

Further discussions about the racial disparities in ECE quality have emphasized the importance of improved data collection and reporting to understand the association between race and center quality¹⁷. Additionally, the National Institute for Early Education Research recommends federal quality guidelines and federal incentives for state guidelines to improve quality of programs beyond Head Start¹⁷. Overall, organizations working to advance racial equity in ECE recommend addressing affordability and quality, emphasizing “racially and culturally competent programming”, and valuing a well-trained and diverse ECE workforce based on the current state of the research¹⁵.

2.4 Nativity in Early Childhood Health and Education Research

First and second generation immigrant children are more likely to experience poverty than their non-immigrant counterparts and therefore also benefit from additional support throughout early childhood⁴⁷. This section of the review will explore the current state of the literature linking

ECE, disparities based on immigration status, and health outcomes as the basis for understanding how ECE programs and the communities in which they are located can better serve immigrant families.

When considering disparities in access to ECE and their potential impact on health disparities for immigrants, first it is important to acknowledge that there is limited research about immigrants in ECE in general, though the remainder of this section will highlight some of the recent work in this area. One reason for this research disparity may be the lack of consistent and culturally sensitive collection of data around immigration⁴⁸. As with research on race and ethnicity in ECE, immigration research in this area often relies on data from the ECLS-B study, whose youngest participants aged out of ECE in 2007.

Similar to the research on race and ethnicity and ECE, research on immigration and ECE that addresses disparities as compared to immigrant children's non-immigrant peers tends to fall within the first and second generations of the health disparities research framework³⁷. Two papers recent papers from the same research group have explored the role of community contexts as drivers of disparities in ECE arrangements between Mexican-origin, Black, and White families. In the 2018 paper, the authors explore demand for care as measured by maternal employment, finding that higher maternal employment is associated with increased use of informal care, particularly for Mexican-origin and Black families⁴⁹. In the 2019 paper, the authors explore childcare enrollment by whether neighborhoods are new or established destinations for Latinos, finding that enrollment disparities between new and established destinations are particularly large for Mexican-origin families with low acculturation scores⁵⁰. In a study of Hispanic families, specifically Spanish-speaking dual language learners (DLLs), researchers found higher Head Start attendance of DLLs versus non-DLLs when assigned to an eligible Head Start program through the Head Start Impact

Study, which either assigned families who had applied to Head Start or a control, where caregivers could enroll their children in another program⁵¹. The researchers also found that DLLs not assigned to the Head Start group attended higher-quality ECE programs than non-DLLs⁵¹.

Looking at the literature that addresses policy implications more explicitly, racial and nativity-based disparities in preschool enrollment can be attributed to the other structural variables in his model that reflect “the accumulation of inequality,” including English proficiency, income, and long waitlists for child care subsidies⁵². Others have also examined contextual factors affecting ECE participation among low-income immigrant children, finding variables including maternal education, prior receipt of benefits, ECE availability, and immigrant-specific factors such as English proficiency to be salient⁵³. One area of focus has been the importance of increased funding and support for public ECE programming, as well as structural changes in the hiring and application process that can reduce barriers around applying for spaces and communicating with administrators and teachers⁵³. Finally, it is important to examine neighborhood contexts as drivers of disparities in ECE enrollment between immigrant and non-immigrant children⁵⁴. Of note is that immigrant families, but not non-immigrant families, experience increased likelihood of ECE enrollment as the size of their neighborhood friends/kin networks grows, offering a potential avenue for improving access to and use of ECE programs among immigrants.

As with the literature on race, much of the discussion regarding the intersection between ECE, health, and immigration is outdated, remains in the grey literature, and does not fully bring in health and development outcomes beyond academic measures. A regression discontinuity design that links Head Start participation to life opportunities and health outcomes is a key study used to support Head Start, but is now 12 years old⁵⁵. Many of even the more recently published papers rely on data that is a decade or more old in the case of ECLS-B data. While on the one hand

it is important to move beyond mere disparity description, considering the rapidly increasing and diversifying immigrant population and ever-changing policy environment, it is important to capture these changes in current ECE data systems so they can be used for up-to-date research.

Additionally, and to an even greater extent than the literature on ECE and race and ethnicity, much of the research in the field exists in the grey literature – in policy briefs and reports produced by state or federal programs behind ECE programming or think tanks. For example, think tanks have provided important information regarding the health of immigrant children⁸, the impact of immigration policy on ECE⁵⁶, and one of the few explicit explorations of the nexus of immigration, health, and ECE³³.

3.0 Journal Article

3.1 Abstract

Background: Poverty and its negative health effects are pervasive in early childhood, affecting nearly one in five children under five, and are particularly stark for children of color and immigrant children. Public health and education efforts to promote equity at this critical stage of development often remain siloed, despite evidence for access to quality early childhood education as a strategy to promote public health for young children and their families.

Methods: This study assessed the enrollment patterns of children at an Early Head Start provider in Allegheny County by race and nativity between February 2019 and February 2020. Additionally, it compared children's results on a developmental screener six months after program entry by child race.

Results: Analysis of one Early Head Start (EHS) program in Allegheny County (n = 465 enrollees during study period; n = 266 enrolled for at least 6 months) showed that, despite all children meeting EHS eligibility criteria, there are significant differences in children's family contexts and how they enroll and participate in EHS by race and nativity. For example, immigrant children participate in home-based EHS at a higher rate than their non-immigrant peers (p = <0.001). Analysis of children's developmental screening scores also indicated a disparity between multiracial children and Black children in personal-social development (OR = 3.14, p = 0.03).

Conclusions: Early Head Start is one program that provides access to quality early childhood education for children living in poverty, who are disproportionately children of color and immigrant children. As such, it provides a promising avenue for integrating equity-based

research and pedagogy more fully into its programming. These findings can help EHS practitioners think more broadly about how they interpret the existing demographic data they collect on their enrolled families and what it may tell them about how and why families choose to participate in EHS. Early childhood is a critical stage for prevention and intervention and improving access to quality early childhood education is one component of reducing public health inequities in this stage and across the life course.

3.2 Introduction

Early childhood is a crucial stage for prevention and intervention for both health and education, forming the basis of a child's social, emotional, cognitive, and physical development. However, poverty has been shown to have to have negative health impacts that cause disparities in childhood development and persist through adulthood, including higher rates of learning disabilities, higher rates of childhood asthma, and increased risk for hypertension and diabetes in adulthood¹⁻³. Poverty is pervasive in early childhood. Nationally, nearly 1 in 5 households with children under 5 live in poverty compared to 1 in 10 households overall^{4,5}.

Additionally, children of color and first and second generation immigrant children are more likely to experience poverty and its associated adverse health effects than their white, non-immigrant counterparts due to structural systems of exclusion⁶⁻⁸. While nationally only 16% of White children under 5 live in poverty, 36% of Black children, 36% of American Indian and Alaskan Native children, 23% of multiracial children, and 23% of children with at least one foreign-born parent do^{5,9}. Racial disparities are magnified even further in Allegheny County. Only

9% of white children under 5 in the county live in poverty, compared to 46% of Black children, 38% of multiracial children, and 15% of children with at least one foreign-born parent^{5,9}.

Policies and programs that reduce inequities in early childhood help promote health equity throughout the life course. In 2016, the Community Preventive Services Task Force (CPSTF) conducted a systematic review, through which they recommended quality, center-based early childhood education (ECE) programs to promote health and educational equity¹⁰. Despite the CPSTF recommendation for access to ECE, there are many barriers that limit this access, particularly for families of color and immigrant families. The cost of care continues to rise – the average cost for childcare in Pennsylvania is \$987 per month for infants and \$814 per month for 4-year-olds¹¹. For families living in poverty, costs as a share of income far outpace the Department of Health and Human Services' recommendation that childcare is affordable if it comprises less than 7% of the family budget; even for median-income Pennsylvanian families these costs comprise 17.5% of their income^{11,12}.

There are in turn stark differences in how young children receive care at the intersections of race, nativity, and socioeconomic status. Although use of non-parental care overall is relatively similar across races and ethnicities, Black children aged 3 to 5 are more likely to attend full-day, center-based preschool programs compared to their peers¹³ while Hispanic children from birth to 6 are less likely to attend center-based care of any duration compared to their peers¹⁴. Immigrant families are less likely to rely on non-parental care compared to non-immigrant families and when they do use non-parental care, they are more likely to use the care of other relatives¹⁵.

There are a variety of structural factors that affect these differences in ECE access and use. Complex income eligibility rules for public programs, the availability of programs during non-traditional working hours, and the adequate availability of childcare slots near public transit in

neighborhoods where eligible families live create access issues that disproportionately impact families of color and immigrant families¹⁵.

There are also differences in the quality of centers that children of color attend, using both traditional measures of quality and considering what equitable ECE curriculums look like more broadly. Analysis of state-funded preschool programs in 26 states, not including Pennsylvania, by The Education Trust found that only 4% of Black children and 1% of Latino children were attended a program in a state whose program standards met the National Institute for Early Education Research's (NIEER) requirements for "high quality"¹⁶. NIEER's measures include programs having lower child-teacher ratios, higher levels of teacher education, and the use of continuous quality improvement systems¹⁶. While The Education Trust's analysis was conducted at the state level, this disparity persists for Black children at the childcare center level, with Black children more likely to attend medium or low quality Head Start programs compared to their peers¹⁷.

Additionally, the "definitions of quality in early childhood settings often reflect the views of the dominant language and culture and may fail to elevate standards on diversity or alternative concepts of quality"¹⁵. While there are some models that emphasize the importance of centering families of color and immigrant families within ECE programming, they are not cohesive and require sustained efforts from policymakers and practitioners to put into practice^{15,18}. Under the dominant, White-centric ECE system, children of color are disproportionately disciplined, disrupting their access to early education, which can have cascading effects on their future health and development^{15,19}. Incorporating measures of quality that center equity pedagogy is crucial to building an equitable ECE system¹⁸.

Two related programs that are designed reduce early childhood inequities and have the potential to incorporate equity pedagogy are Head Start (HS) and Early Head Start (EHS). Head

Start and Early Head Start [(E)HS] are federal programs that provide free access to high quality early childhood education from birth to age five for children whose families live below the poverty line²⁰. Early Head Start (EHS) serves children from birth to three while Head Start serves children from three to five²⁰. Currently, (E)HS's approach to serving children from diverse backgrounds is guided by Multicultural Principles for Early Childhood Leaders, which emphasizes ensuring the families served by each center are represented in its programming, supporting dual language learners, and challenging individual and institutional biases²¹. Additionally, (E)HS's program standards regarding the learning environment include provisions for dual language learners²². As a long-standing and wide-reaching program, (E)HS offers an opportunity to understand how its services currently serve young children and to discover how its framework can be leveraged to further promote health equity beyond its existing efforts.

3.3 Methods

3.3.1 Population

The study population are children enrolled in the Council of Three Rivers American Indian Center's (COTRAIC) EHS program (n = 465) from February 2019 to February 2020. Data was collected via enrollees' paper records, which are filled out by children's guardians, occasionally with assistance from COTRAIC staff, at the time of program entry. De-identified data was entered into a secure database between November 2019 and February 2020 and includes all children who enrolled in the program for at least 45 days between February 2019 and February 2020, long

enough to complete their first developmental assessment. Just over half of children received EHS services through COTRAIC for at least six months during this period (n = 266).

3.3.2 Outcomes

All children enrolled in EHS through COTRAIC are assessed with the Ages and Stages Questionnaire, Third Edition (ASQ-3) and the Ages and Stages Questionnaire: Social-Emotional, Second Edition (ASQ-SE) within 45 days of enrollment and every six months thereafter. This project measures whether children met the ASQ-3 and ASQ-SE cutoffs at program entry and at their first six-month reassessment, if applicable.

The ASQ-3 and ASQ-SE are developmental screening tools for ages one month to 5 ½ years that can be completed by guardians and scored by a child's teacher and are designed to identify children who may require further assessment and early intervention services^{57,58}. The ASQ-3 screens across five domains - communication, gross motor, fine motor, problem solving, and personal-social – while the ASQ-SE screens social-emotional development^{57,58}. Two standard deviations below the mean is recommended as the cutoff score for further assessment and early intervention⁵⁹. As such, in this study, a score two or more standard deviations below the mean was considered a positive screen or out of range for typical development while all other scores were considered in range.

Both the ASQ-3 and ASQ-SE have high validity and reliability compared to similar developmental screening tools. Test-retest reliability is 0.91, interrater reliability is 0.93, and sensitivity and specificity are both 0.86 when using two standard deviations from the mean as a cutoff⁵⁹. Data for the third edition of the ASQ was collected from a racially and socioeconomically diverse group of parents and guardians in the United States between January 2004 and June 2008

(n = 18,572 questionnaires)⁵⁹, which is important for understanding its reliability in screening children in poverty and children of color, who comprise the vast majority of this study's population.

However, it is important to recognize the limitations of using a screening tool like the ASQ beyond its scope. The researchers who helped develop the ASQ in the 1970s, caution against “stretching” the use of the ASQ beyond the scope of its evidence base, describing how the ASQ and similar screeners “report little or no information on their use for eligibility determination, goal/intervention content development, or evaluation of child progress,” limiting their use in comparing between children and longitudinally⁶⁰. However, they also note that, especially in publicly-funded settings such as EHS, programs may rely on the ASQ for both developmental screening and evaluation as it is quicker, cheaper, and can be completed by guardians⁶⁰. In the case of this study, information regarding children's Ounce Scales, COTRAIC's primary assessment tool, which is designed explicitly for assessment, was not consistently available in their paper charts and the researcher did not have access to COTRAIC's online database, and so ASQ data were used instead. In interpreting the following data, it is important to remember that this screener was not designed for evaluation purposes and that comparisons between children using this tool are limited.

3.3.3 Covariates

Child demographic covariates include gender (female coded 1), age (recorded continuously in months and later recoded into 12-month intervals), race, ethnicity, and nativity. Race was coded as White, Black, Asian, Alaskan Native/American Indian, multiracial, and other race. Due to the small size of these last three racial categories, they were combined and labelled “multiracial/other

race.” The majority (78.7%) of children in this category were multiracial. Hispanic ethnicity was derived from the child or their guardian’s primary language as recorded in their chart, with confirmation from COTRAIC staff (Hispanic ethnicity coded 1). Asian ethnicity was added due to this program’s large Asian population, particularly in its home-based option. Asian ethnicity was coded as: Burmese, Nepali/Bhutanese, Other Asian, or Non-Asian. Nativity was coded as either immigrant or non-immigrant based on children with at least one foreign born caregiver, as reported by COTRAIC staff if the researcher had not previously met the child.

Family covariates include family type, primary caregiver education, and eligibility type. Family type was coded as two-parent, single parent, or other (e.g. foster parents, mother and grandmother, aunt and uncle) based on the listed primary caregiver and additional household inhabitants on the child’s enrollment form. Primary caregiver education was coded as less than high school; high school or equivalent; some college, Associates, or vocational school; or Baccalaureate or higher. While EHS’s primary target population is family’s living in poverty, there are also several other routes to eligibility, including children in foster care and homeless families, and up to 10% of enrollees may be over-income⁶¹. Due to the low enrollment via each of these categories, eligibility was recoded into poverty and other eligibility route (other eligibility route coded as 1).

Childcare covariates include program type and current enrollment status. Children enrolled in EHS receive either home-based services from a home visitor for 1.5 hours per week or attend a childcare center run directly by COTRAIC or one of its childcare partners (center-based childcare coded as 1). Current enrollment status reflects whether a child was enrolled in EHS in February 2020 or had exited the program (exited coded as 1). Children exit the program for a variety of reasons that are not captured by this data, including ageing out at their third birthday, moving to a

different EHS service area, or their family attaining the ability to afford a private pay childcare center.

3.3.4 Statistical analysis

Initial demographic differences were assessed between both immigrant and non-immigrant children as well as children of different races. Analysis was only run for children who were enrolled in COTRAIC's EHS program for at least six months, as files commonly had notes from family support specialists and home visitors stating that children seemed uncharacteristically shy during their initial screening. Using the six-month screen provides time for children and their families to get more comfortable with their home visitor or family support worker, who assists with completing the ASQ-3 and ASQ-SE. This decision excluded 195 children from racial analyses and 187 children from nativity analyses (eight children enrolled for at least six months had nativity status information but no race information available). Chi squared tests comparing the demographics of children enrolled for more than six months compared to less than six months at the time of data entry are presented in Appendix Supplemental Tables, Table 6. The immigrant population of this program is relatively small and there is considerable confounding by program type, limiting further analysis, so logistic regression was only run for outcomes by race.

Logistic regression was used to estimate the odds of a positive screen (two standard deviations below the mean) on the ASQ-3 domains and the ASQ-SE after six months of enrollment in EHS. Black children were treated as the reference group as they compose the majority of COTRAIC EHS enrollees. Race was treated as a categorical variable to account for the varying experiences and contexts of different communities of color.

Stata version 15.1 and an alpha level of 0.05 were used for all analyses.

3.4 Results

Table 1 presents the demographic characteristics of COTRAIC EHS enrollees by family race. There are considerable differences in children's enrollment characteristics on race. Asian children (90.0%) and multiracial children (51.5%) are more likely to live in two parent households. Asian enrollees had the lowest proportion of primary caregivers who had completed high school (69.6%) while Black enrollees had the lowest proportion of primary caregivers with a college degree (11.8%). Higher proportions of White and multiracial children enrolled in EHS through avenues other than meeting the federal poverty guideline for their family size compared to Black and Asian families (31.3%, 30.3%, 13.8%, 4.4%). Finally, while Asian children enroll in the home-based program at incredibly high rates (95.7%), White children also enroll in the home-based program at higher rates than their Black and multiracial counterparts (34.4%, 5.3%, 18.2%). Overall, these tables show differences in the family contexts and enrollment choices of EHS families by race and nativity.

Analysis of demographic characteristics of enrollees by child nativity also revealed significant differences in enrollment patterns. There was considerable confounding between nativity and race (75.9% Asian) and program type (86.2% home-based). Additionally, this subgroup makes up a small portion ($n = 29$) of COTRAIC's overall enrollment. For these reasons, further analysis focused only on race. Full demographic characteristics of enrollees by child nativity are presented in Appendix Supplemental Tables, Table 5.

Table 1 - Demographic characteristics of children enrolled in COTRAIC Early Head Start, 2019-2020 by race (n=240)

| Characteristic N (percent) | White (n = 32, 13.3) | Black/AA (n = 152, 63.3) | Asian (n = 23, 9.6) | Multiracial/other race (n = 33, 13.8) | p-value |
|--------------------------------------------|---------------------------------|-------------------------------------|----------------------------|--------------------------------------------------|----------------|
| Gender | | | | | 0.779 |
| Male | 15 (46.9) | 78 (51.3) | 10 (43.5) | 16 (48.5) | |
| Female | 17 (53.1) | 74 (48.7) | 13 (56.5) | 17 (51.5) | |
| Age at program entry, in months | | | | | 0.047* |
| 0-12 | 13 (40.6) | 75 (49.3) | 17 (73.9) | 12 (36.4) | |
| 13-24 | 15 (46.9) | 62 (40.8) | 5 (21.7) | 13 (39.4) | |
| 25-36 | 7 (12.58) | 15 (9.9) | 1 (4.4) | 8 (24.2) | |
| Nativity | | | | | <0.001* |
| Immigrant | 0 (0.0) | 2 (1.3) | 22 (95.7) | 2 (6.1) | |
| Non-immigrant | 32 (100.0) | 143 (94.1) | 1 (4.4) | 29 (87.9) | |
| Missing | 0 (0.0) | 7 (4.6) | 0 (0.0) | 2 (6.1) | |
| Family type | | | | | <0.001* |
| Two-parent | 11 (34.4) | 53 (34.9) | 20 (90.0) | 17 (51.5) | |
| Single parent | 19 (59.4) | 91 (59.9) | 3 (13.0) | 15 (45.6) | |
| Other | 2 (6.3) | 8 (5.3) | 0 (0.0) | 1 (3.0) | |
| Primary caregiver education | | | | | <0.001* |
| < High school | 1 (3.1) | 4 (2.6) | 7 (30.4) | 1 (3.0) | |
| High school or equivalent | 17 (53.1) | 54 (35.5) | 8 (34.8) | 10 (30.3) | |
| Some college or equivalent | 6 (18.8) | 58 (38.2) | 1 (4.4) | 15 (45.5) | |

Table 1 Continued

| Characteristic N (percent) | White (n = 32, 13.3) | Black/AA (n = 152, 63.3) | Asian (n = 23, 9.6) | Multiracial/other race (n = 33, 13.8) | p-value |
|---------------------------------------|---------------------------------|-------------------------------------|----------------------------|--------------------------------------------------|----------------|
| College or higher | 7 (21.9) | 18 (11.8) | 4 (17.4) | 5 (15.2) | |
| Missing | 1 (3.1) | 18 (11.8) | 3 (13.0) | 2 (6.1) | |
| Program type | | | | | <0.001* |
| Home-based | 11 (34.4) | 8 (5.3) | 22 (95.7) | 6 (18.2) | |
| Center-based | 21 (65.6) | 144 (94.7) | 1 (4.4) | 27 (81.8) | |
| Eligibility type | | | | | <0.001* |
| Meets income guidelines | 22 (68.8) | 128 (84.2) | 18 (78.3) | 23 (69.7) | |
| Other form of eligibility | 10 (31.3) | 21 (13.8) | 1 (4.4) | 10 (30.3) | |
| Missing | 0 (0.0) | 3 (2.0) | 4 (17.4) | 0 (0.0) | |
| Current status | | | | | 0.414 |
| Enrolled | 13 (40.6) | 82 (54.0) | 12 (52.2) | 14 (42.4) | |
| Exited | 19 (59.4) | 70 (46.1) | 11 (47.8) | 19 (57.6) | |

Tables 2 and 3 compare children's ASQ-3 and ASQ-SE results six months after enrollment by race using chi-squared tests (Table 2) and logistic regression (Table 3). A child's ASQ-3 composite score is considered out of range if they scored two standard deviations below the mean in one or more of the domains on the ASQ-3. Overall, children of all races did not tend to score out of range on any of the domains. Roughly 1 in 4 children scored out of range in at least one domain, regardless of race, while only 7.5% of children scored out of range on the ASQ-SE (Table 2).

Looking at the unadjusted logistic regression for the ASQ-3 and ASQ-SE results, there does not appear to be a clear and consistent pattern between race and screening results. White children were judged somewhat better on the fine motor, personal-social, and social-emotional domains, while children of other races were generally judged better on the communication and problem-solving domains, and the gross motor domain was mixed. However, these differences were not statistically significant, with the exception of the personal-social domain, where multiracial children had 3.14 times higher odds of scoring out of range compared to their Black peers ($p = 0.03$).

Table 2 - Ages and Stages 3rd Edition (ASQ-3) and Ages and Stages – Social Emotional (ASQ-SE) results of children enrolled in COTRAIC Early Head Start, 2019-2020 by race (n = 240)

| ASQ Domain N (percent) | White (n = 32) | Black/AA (n = 152) | Asian (n = 23) | Multiracial/other race (n = 33) | p-value |
|-----------------------------------|-----------------------|---------------------------|-----------------------|----------------------------------------|----------------|
| ASQ-3 Communication | | | | | 0.296 |
| In range | 26 (81.3) | 137 (90.1) | 22 (95.7) | 28 (84.9) | |
| Out of range | 6 (18.8) | 15 (9.9) | 1 (4.4) | 5 (15.2) | |
| ASQ-3 Gross motor | | | | | 0.574 |
| In range | 30 (93.8) | 138 (90.8) | 22 (95.7) | 32 (97.0) | |
| Out of range | 2 (6.3) | 14 (9.2) | 1 (4.4) | 1 (3.0) | |
| ASQ-3 Fine motor | | | | | 0.839 |
| In range | 30 (93.8) | 140 (92.1) | 21 (91.3) | 29 (87.9) | |
| Out of range | 2 (6.3) | 12 (7.9) | 2 (8.7) | 4 (12.1) | |
| ASQ-3 Problem solving | | | | | 0.240 |
| In range | 27 (84.4) | 136 (89.5) | 23 (100.0) | 28 (84.9) | |
| Out of range | 5 (15.6) | 16 (10.5) | 0 (0.0) | 5 (15.2) | |
| ASQ-3 Personal-social | | | | | 0.059 |
| In range | 31 (96.9) | 140 (92.1) | 21 (91.3) | 26 (78.8) | |
| Out of range | 1 (3.1) | 12 (7.9) | 2 (8.7) | 7 (21.1) | |
| ASQ-3 composite score | | | | | 0.709 |
| In range | 22 (68.8) | 113 (74.3) | 19 (82.6) | 25 (75.8) | |
| Out of range | 10 (31.3) | 39 (25.7) | 4 (17.4) | 8 (24.2) | |
| ASQ-SE | | | | | 0.376 |
| In range | 31 (96.9) | 142 (93.4) | 20 (87.0) | 29 (87.9) | |
| Out of range | 1 (3.12) | 10 (6.58) | 3 (13.0) | 4 (12.1) | |

Table 3 - Unadjusted Ages and Stages 3rd Edition (ASQ-3) and Ages and Stages – Social Emotional (ASQ-SE) logistic regression of children enrolled in COTRAIC Early Head Start, 2019-2020 by race (n = 240)

| ASQ Domain | Odds ratio (95% CI) | p-value |
|------------------------|----------------------------|----------------|
| Communication | | |
| Black/AA | Ref | Ref |
| White | 2.11 (0.75, 5.93) | 0.16 |
| Asian | 0.42 (0.05, 3.30) | 0.41 |
| Multiracial/other race | 1.63 (0.55, 4.85) | 0.38 |
| Gross motor | | |
| Black/AA | Ref | Ref |
| White | 0.66 (0.14, 3.04) | 0.59 |
| Asian | 0.45 (0.06, 3.58) | 0.45 |
| Multiracial/other race | 0.31 (0.04, 2.43) | 0.26 |
| Fine motor | | |
| Black/AA | Ref | Ref |
| White | 0.78 (0.17, 3.66) | 0.75 |
| Asian | 1.11 (0.23, 5.32) | 0.90 |
| Multiracial/other race | 1.61 (0.48, 5.34) | 0.44 |
| Problem solving | | |
| Black/AA | Ref | Ref |
| White | 1.57 (0.53, 4.66) | 0.41 |
| Asian | 1 | -- |
| Multiracial/other race | 1.52 (0.51, 4.48) | 0.45 |
| Personal-social | | |
| Black/AA | Ref | Ref |
| White | 0.38 (0.05, 3.00) | 0.36 |
| Asian | 1.11 (0.23, 5.31) | 0.90 |
| Multiracial/other race | 3.14 (1.13, 8.72) | 0.03* |
| ASQ-SE | | |
| Black/AA | Ref | Ref |
| White | 0.46 (0.06, 3.71) | 0.46 |
| Asian | 2.13 (0.54, 8.40) | 0.28 |
| Multiracial/other race | 1.96 (0.57, 6.68) | 0.28 |

Further logistic regression was conducted focusing on the personal-social domain, seen in Table 4, using Black children as the reference group. Model building consisted of adding child-

level variables (age, gender, nativity), followed by family-level variables (family type, eligibility type, and primary caregiver education), and program-level variables (current enrollment and program type). The final model consisted of all covariates that had a p-value < 0.5 during the model-building process – gender, family type, eligibility type, and program type – as well as child age. The odds for multiracial children’s scores were statistically significant in the null model and in Model 1, which adjusted for child age, gender, and nativity. In Model 1, multiracial children have 3.14 times higher odds of scoring out of range in the ASQ-3 problem solving domain compared to their Black peers.

The results presented here indicate that across most races and domains, there are not significant differences in child development as measured by the ASQ-3 and ASQ-SE screeners, with the exception of the performance of multiracial children on the personal-social domain.

Table 4 - Ages and Stages 3rd Edition (ASQ-3) Personal-Social Logistic Regression by Race (n = 240)

| Model | Odds Ratio (95% CI) | p-value |
|------------------------|----------------------------|----------------|
| Unadjusted | | |
| Black/AA | Ref | Ref |
| White | 0.38 (0.05, 3.00) | 0.36 |
| Asian | 1.11 (0.23, 5.31) | 0.90 |
| Multiracial/other race | 3.14 (1.13, 8.72) | 0.03* |
| Model 1 | | |
| Black/AA | Ref | Ref |
| White | 0.38 (0.05, 3.04) | 0.36 |
| Asian | 1.27 (0.25, 6.47) | 0.78 |
| Multiracial/other race | 3.10 (1.09, 8.80) | 0.03* |
| Model 2 | | |
| Black/AA | Ref | Ref |
| White | 0.39 (0.05, 3.19) | 0.38 |
| Asian | 0.96 (0.18, 5.23) | 0.96 |
| Multiracial/other race | 2.84 (0.98, 8.21) | 0.05 |
| Model 3 | | |
| Black/AA | Ref | Ref |

Table 4 Continued

| | | |
|------------------------|-------------------|------|
| White | 0.32 (0.04, 2.84) | 0.31 |
| Asian | 0.63 (0.08, 4.82) | 0.65 |
| Multiracial/other race | 2.61 (0.87, 7.78) | 0.09 |
| Model 4 | | |
| Black/AA | Ref | Ref |
| White | 0.32 (0.04, 2.81) | 0.31 |
| Asian | 0.60 (0.08, 4.44) | 0.61 |
| Multiracial/other race | 2.62 (0.88, 7.79) | 0.08 |

Model 1: Individual-level covariates (age, gender, and nativity)

Model 2: Individual and family-level covariates (family type, education, and eligibility type)

Model 3: Individual, family, and program-level covariates (current enrollment and program type)

Model 4: Retained age ($p = 0.83$ in Model 3) and all other covariates with $p < 0.5$ in Model 3 (gender, family type, eligibility, and program type)

3.5 Discussion and Conclusions

3.5.1 Enrollment and Outcomes in EHS

The demographic characteristics of COTRAIC’s EHS enrollees differ significantly by race and nativity, generally reflecting nationwide demographic trends. Among COTRAIC enrollees, Asian children were far more likely to live in two-parent households, which mirrors national trends as of 2018⁶². Living in a two-parent household is one potential explanation for the increased preference of children from Asian families for the home-based EHS option. The 2016 wave of the Early Childhood Program Participation Survey, part of the National Household Education Surveys Program, reported that 42% of children under six from two-parent households did not receive nonparental care compared to between 33% of children from other household arrangements⁶³. Additionally, given the intersection of EHS’s Asian population and its immigrant population, it is also important to understand how immigration structures ECE preferences. A small field of research has found that immigrant families are less likely to use nonparental care, and in particular,

center-based care, for their children^{50,53,64,65}. Potential mechanisms for this disparity include higher poverty rates among immigrants and difficulties navigating the enrollment process in English. However, one study did find that kin network size predicted increased ECE enrollment for immigrants but not non-immigrants and may therefore be an important pathway to increase enrollment in this population⁵⁴. Indeed, given that COTRAIC's immigrant population currently comes from two refugee communities – Nepali/Bhutanese and Burmese – these kin networks are already an important part of how eligible immigrant families learn about and access the program.

Another important demographic difference is in how children of different races come to be eligible for COTRAIC's EHS programming. Although EHS is designed as an anti-poverty program, there are multiple routes to eligibility and in this sample, White and multiracial/other race children were more likely to access EHS through these alternate routes than their Black and Asian peers. These routes include homelessness, including residence at a domestic violence transitional housing program that has a COTRAIC classroom, as well as being in foster care, or having an income above the Federal Poverty Level. EHS program standards allow over-income children to enroll if programs have made suitable efforts to enroll income-eligible families and the child and their family would benefit from EHS participation, often because the child is receiving or is likely to receive Early Intervention services⁶¹. Given the significant results discussed below for multiracial children, it is important to consider the potential interaction between over-income enrollees in particular, race, and children flagged for potential developmental delays.

Overall, children in COTRAIC's EHS program generally performed as expected on the ASQ-3 and ASQ-SE screeners, regardless of race, with 5-10% of children having a screen that would flag them for further evaluation. However, multiracial/other race children differed significantly from their peers in the ASQ-3 personal-social domain. The personal-social domain

assesses children's abilities to recognize themselves and others and perform activities of daily living, as appropriate to their age, such as helping to dress themselves or feeding themselves. In the unadjusted model, these children had 3.14 higher odds compared to their Black peers of scoring out of range ($p = 0.03$) and in the final model they had 2.61 times higher odds compared to their Black peers ($p = 0.09$), after controlling for age, gender, family type, eligibility type, and program type.

3.5.2 Multi-racial children in ECE research

This analysis highlights a potential disparity between Black and multiracial EHS enrollees in personal-social skills in early childhood. However, this disparity is difficult to put into context due to the lack of research that includes multiracial children as a separate category. Only in the past decade has the U.S. government began consistently collecting and reporting data that includes multiracial as a separate racial category in surveys regarding ECE experiences. Even so, large, population-based surveys such as the Early Childhood Program Participation Survey, often default to reporting demographics for White, Black, and Hispanic children only⁶². This lack of available data regarding multiracial children and their educational experiences is despite the considerable growth of this population relative to other races and ethnicities. The multiracial youth population doubled between 2000 and 2017, comprising 4% of all U.S. youth and is the country's fastest growing youth demographic, expected to comprise 11.6% of U.S. youth by 2060^{62,66}.

There is limited research focusing on multiracial children, particularly in educational settings, and how their race affects their identity formation and development. Research regarding identity formation has suggested that multiracial youth may experience accelerated identity development as they navigate interactions with family members from different backgrounds from

a young age⁶⁶. Relatedly, multiracial youth are more likely to experience diverse social settings from a young age, supporting their development of cognitive flexibility compared to their monoracial peers⁶⁶. That is, even if multiracial children are perceived as a monoracial by their teachers, peers, and evaluators, their experiences are still those of someone who is multiracial. Research among multiracial adults has demonstrated the complex outcomes of identity formation regarding self-rated health, finding no single model of multiracial health is applicable for all multiracial combinations⁶⁷.

What data exists in early childhood indicates disparities for multiracial children compared to their White peers. At the national level, 16% of White children under five live in poverty compared to 23% of multiracial children⁵. In Allegheny County this disparity is magnified; 9% of White children under five in the county live in poverty, compared to 38% of multiracial children⁵. Although in this study's population, both White and multiracial families qualified for EHS through similar routes, it is still important to note this disparity and consider what factors may drive multiracial families to qualify through routes other than being below the FPL. Additionally, the three states that report kindergarten readiness by race/ethnicity demonstrate disparities between multiracial children and their White peers. In Washington, multi-racial children scored above their Black, Hispanic, and American Indian/Alaskan Native (AI/AN) peers but below their White and Asian peers in all five domains measured by the Washington Kindergarten Inventory of Developing Skills (cognitive, language, literacy, math, physical, and social-emotional), last updated in 2016⁶⁸. Multiracial kindergarteners in Virginia scored higher than their Black and AI/AN peers and lower than their White and Asian peers in literacy fundamentals as of 2019⁶⁹. In Delaware, multiracial children entering kindergarten in 2017 outscored their Black and Hispanic

peers but were outscored by their White and Asian peers in five domains of kindergarten readiness – cognitive, language, literacy, physical, and social-emotional⁷⁰.

It is also important to consider how the effects of disparities experienced by multiracial children may affect them across the life course. Data from the 23 states that used the Adverse Childhood Experience (ACE) module on the 2011-2018 Behavioral Risk Factor Surveillance System (BRFSS) surveys found disparities in multiracial respondents' childhood experiences compared to both their Black and White peers. Multiracial respondents had experienced all of the adverse experiences on the module at higher rates than both their Black and White peers, with the exception of parental divorce or separation, which Black respondents had experienced at a slightly higher rate (42.5% vs. 38.7%)⁷¹. Overall, multiracial respondents had a mean ACE score of 2.52 compared to 1.69 for Black respondents and 1.52 for White respondents; the scores for both multiracial and Black respondents differed significantly from White respondents⁷¹. Higher ACE scores have been associated with increased risk of morbidity and mortality as well as decreased life opportunities⁷¹.

The results of the BRFSS analysis are of particular interest because they found disparities between not just multiracial and White subgroups but between multiracial and Black subgroups. More common explanatory mechanisms in the research, which are supported by other survey data discussed above, are “upward iteration” and “hypodescent” which are that the health of multiracial respondents will fall somewhere between the racial groups to which they belong, trending either towards the most- or least-advantaged group, respectively⁶⁷. Both the BRFSS study and this study indicate the potential for another mechanism – “multiracial distinction”, where the health of multiracial individuals is either better or worse than all component groups of one's identity⁶⁷.

3.5.3 Limitations

It is important to note that although the ASQ-3 and ASQ-SE can be completed entirely by a child's caregiver, in this population, these screeners are generally completed collaboratively by the caregiver and the child's teacher, family support specialist, or home visitor. Therefore, there is potential for response bias by the child's parent, as they may consider answers that show their child developing at or above target more desirable. There is also the potential for observer bias rooted in the educational provider's relationship with the caregiver and the child.

Additionally, it is important to remember that the tools themselves – the ASQ-3 and ASQ-SE – are screening tools, not assessment or evaluation tools. Their use is therefore limited when comparing between children and results do not indicate the presence or absence of developmental disorders, but rather a tool for educators and caregivers to use to screen for if additional assessment may be needed⁶⁰. COTRAIC also considers the ASQ its secondary assessment tool for the purpose of reporting to the Office of Head Start. While screening tools have value, particularly in publicly-funded programs, due to their lower implementation cost and ability to be completed by caregivers, interpreting their results beyond their intended use is limited.

Additionally, although this study analyzed data from all of EHS program's enrollees across a single year, the population under study was still relatively small (n = 240 for racial analysis). Due to the small size of the non-Black racial subgroups, conducting more sophisticated statistical tests was not possible. While the size of the Black subgroup provided the unique opportunity to use Black children as the reference group rather than White children, it does limit generalizability with respect to comparing how multiracial children compare to other races due to the primacy of using White participants as the reference group in research. Generalizability is also limited as this study focused on participants in one non-profit's EHS program, which has its own operating norms

even compared to other EHS programs in Allegheny County, let alone other geographic areas or non-EHS programs. However, this study does provide a starting point for exploring how existing screening tools can be leveraged to explore racial differences in ECE programs and conducting further investigations regarding potential disparities experienced by multiracial children compared to their Black and White peers.

3.5.4 Implications for future research

This study demonstrates differences in the demographic characteristics of EHS enrollees by both race and ethnicity that generally follow broader national patterns. These patterns reflect disparities between White children and children of other races and between native and immigrant children that structure how children access quality childcare. Given the association between access to quality childcare and health equity, understanding these enrollment patterns can help ECE programs, particularly those that target low-income children such as EHS, be more responsive to their community's context. Future research might sample from all Allegheny County EHS providers to assess the extent to which enrollment patterns differ between providers. Additionally, research might consider a sample of children from across the county, regardless of ECE enrollment status, to examine if there are racial and nativity differences between children by ECE enrollment. This wider sample would allow researchers to understand how access to ECE itself may play a role in child development.

This study also indicated a disparity between Black and multiracial children in the personal-social domain of the ASQ-3 screener. Further investigation requires the use of an assessment tool rather than a screening tool to see if this disparity is, in fact, significant. Researchers might also consider adding a qualitative element to better understand how caregivers

and educators perceive early childhood development in the context of racial and ethnic identity formation. This would allow them to better contextualize any disparities they uncover.

3.5.5 Conclusions

Improving access to quality ECE is an important aspect of reducing health and educational inequities for children of color and immigrant children. Access to quality ECE has been linked to health and developmental benefits, including improved self-regulation and increased access to health screenings and health-promoting activities^{10,33}. Early Head Start is one program that provides access to quality ECE for children living in poverty, who are disproportionately children of color and immigrant children, and as such provides a promising avenue for integrating equity-based research and pedagogy more fully into its programming.

Analysis of one EHS program in Allegheny County showed that, despite all children meeting EHS eligibility criteria, there are significant differences in children's family contexts and how they enroll and participate in EHS by race and nativity. Analysis of children's ASQ-3 and ASQ-SE scores also indicated a disparity between multiracial children and Black children in personal-social development. This disparity requires further investigation to understand early childhood development in this domain and how it may differ among multiracial and Black children in this population and more broadly.

Investigating racial differences in enrollment patterns and child development at program entry offers an opportunity for EHS and other ECE providers to better understand how their outreach and programming serves children and families of different races. ECE programs seeking to eliminate inequities must go beyond addressing economic disparities and integrate practices that address the structural factors that lead to disparate access to quality ECE for children of color and

immigrant children. Early childhood is a critical stage for prevention and intervention and improving access to quality early childhood education is one component of reducing inequities in this stage and across the life course.

4.0 Thesis Conclusions

Poverty is pervasive in early childhood and is experienced disproportionately by children of color and immigrant children due to structural systems of exclusion. Experiencing poverty in early childhood has been shown to have lasting health impacts, including higher rates of learning disabilities, higher rates of childhood asthma, and increased risk for hypertension and diabetes in adulthood¹⁻³. One avenue that has been shown to help reduce inequities in early childhood is access to quality early childhood education⁷². This thesis explored current disparities in access to and use of early childhood education using data from an Early Head Start provider in Allegheny County, Pennsylvania.

There are differences in how children access and receive care by race and nativity, although use of non-parental care overall is relatively similar. Black children aged three to five are more likely to attend full-day, center-based preschool programs compared to their peers¹³ while Hispanic children from birth to six are less likely to attend center-based care of any duration compared to their peers¹⁴. Immigrant families are less likely to rely on non-parental care compared to non-immigrant families and when they do use non-parental care, they are more likely to use the care of other relatives¹⁵. These differences are driven not just by racial differences in income, but by structural differences that disproportionately impact families of color and immigrant families. For example, complex income eligibility rules and work requirements for public programs disproportionately impact families of color, as they are disproportionately un- and underemployed in the low-wage workforce and caregivers who are non-native English speakers¹⁵.

Another important element of equitable access is quality. Children of color attend lower quality childcare centers, on average, compared to their white peers⁷³. Even within programs

known for their rigorous quality standards, such as Head Start and Early Head Start, there are racial disparities in the quality of centers that children attend. Black and Hispanic children are more likely to attend medium or low quality Head Start programs compared to their White peers^{17,73}.

Given these disparities in terms of access and quality and differing patterns of childcare enrollment, Head Start and Early Head Start provide a potential pathway to incorporate equity-based research and pedagogy. (E)HS acknowledges the importance of responding to diverse community needs and contexts, guided by a set of Multicultural Principles for Early Childhood Leaders as well as programs for American Indian and Alaskan Native children, children of migrant and seasonal farmworkers, and program standards relating to the education of dual language learners^{21,22}. However, given that (E)HS was established and continues to be framed primarily as a poverty reducing program, there are still opportunities to understand what, if any, disparities are currently evident among its enrollees and how its framework as a high quality, federal ECE program can be leveraged to more fully incorporate an equity-based framework.

The study included in this thesis investigated the enrollment patterns and child development scores six months after program entry of children enrolled in EHS through one of Allegheny County's EHS providers. This study demonstrated significant differences by race and nativity in children's family contexts and in how they enroll and participate in EHS. Analysis of children's developmental screener scores also indicated a disparity between multiracial children and Black children in personal-social development. This disparity requires further investigation to understand early childhood development in this domain and how it may differ among multiracial and Black children in this population and more broadly.

Investigating racial differences in enrollment patterns and child development at program entry offers an opportunity for EHS and other ECE providers to better understand how their

outreach and programming serves children and families of different races. ECE programs seeking to eliminate inequities must go beyond addressing economic disparities and integrate practices that address the structural factors that lead to disparate access to quality ECE for children of color and immigrant children. Early childhood is a critical stage for prevention and intervention and improving access to quality early childhood education is one component of reducing inequities in this stage and across the life course.

Appendix Supplemental Tables

Table 5 - Demographic characteristics of children enrolled in COTRAIC Early Head Start, 2019-2020 by nativity (n=248)

| Characteristic N (percent) | Immigrant (n=29, 11.7) | Non-immigrant (n=219, 88.3) | p-value |
|-------------------------------|------------------------|-----------------------------|---------|
| Gender | | | 0.5 |
| Male | 16 (55.2) | 108 (49.3) | |
| Female | 13 (44.8) | 111 (50.7) | |
| Age at program entry | | | .01* |
| 0-12 months | 22 (75.9) | 103 (47.0) | |
| 13-24 months | 5 (17.2) | 90 (41.1) | |
| 25-36 months | 2 (6.9) | 26 (11.9) | |
| Race | | | <0.001* |
| White | 0 (0.0) | 32 (14.6) | |
| Asian | 22 (75.9) | 1 (0.5) | |
| Black | 2 (6.9) | 143 (65.3) | |
| Multiracial/other race | 2 (6.9) | 29 (13.2) | |
| Missing | 3 (10.3) | 14 (6.4) | |
| Asian ethnicity | | | <0.001* |
| Nepali/Bhutanese | 16 (55.2) | 0 (0.0) | |
| Other Asian | 7 (24.1) | 0 (0.0) | |
| Not Asian | 5 (17.2) | 199 (90.9) | |

Table 5 Continued

| Characteristic N (percent) | Immigrant (n=29, 11.7) | Non-immigrant (n=219, 88.3) | p-value |
|------------------------------------|------------------------|-----------------------------|---------|
| Missing | 1 (3.5) | 20 (9.1) | |
| Hispanic ethnicity | | | 0.001* |
| Hispanic | 4 (13.8) | 4 (1.8) | |
| Non-Hispanic | 25 (86.2) | 194 (88.6) | |
| Missing | 0 (0.0) | 21 (9.6) | |
| Family type | | | <0.001* |
| Two-parent | 22 (75.9) | 83 (37.9) | |
| Single parent | 7 (24.1) | 125 (57.1) | |
| Other | 0 (0.0) | 11 (5.0) | |
| Primary caregiver education | | | <0.001* |
| < High school | 8 (27.6) | 5 (2.3) | |
| High school or equivalent | 11 (37.9) | 82 (37.4) | |
| Some college or equivalent | 0 (0.0) | 81 (37.0) | |
| College or higher | 5 (17.2) | 31 (14.2) | |
| Missing | 5 (17.2) | 20 (9.1) | |
| Program type | | | <0.001* |
| Home-based | 25 (86.2) | 23 (10.5) | |
| Center-based | 4 (13.8) | 196 (89.5) | |
| Eligibility type | | | 0.006* |
| Meets income guidelines | 22 (75.9) | 177 (80.8) | |
| Other eligibility type | 3 (10.3) | 37 (16.9) | |
| Missing | 4 (13.8) | 5 (2.3) | |
| Current status | | | 0.772 |
| Enrolled | 14 (48.3) | 112 (51.1) | |
| Exited | 15 (51.7) | 107 (48.9) | |

Table 6 - Demographic characteristics of children enrolled in COTRAIC Early Head Start, 2019-2020 by length of enrollment (n=465)

| Characteristic N (percent) | Enrolled <6 months (n = 199, 42.8) | Enrolled >6 months (n = 266, 57.2) | p-value |
|---------------------------------------|----------------------------------------------|----------------------------------------------|----------------|
| Gender | | | 0.707 |
| Male | 103 (51.8) | 133 (50.0) | |
| Female | 96 (48.2) | 133 (50.0) | |
| Age at program entry | | | <0.001* |
| 0-12 months | 81 (40.7) | 134 (50.4) | |
| 13-24 months | 58 (29.2) | 104 (39.1) | |
| 25-36 months | 60 (30.2) | 28 (10.5) | |
| Race | | | 0.140 |
| White | 26 (13.1) | 32 (12.0) | |
| Asian | 7 (3.5) | 23 (8.7) | |
| Black | 109 (54.8) | 152 (57.1) | |
| Multiracial/other race | 34 (17.1) | 33 (12.4) | |
| Missing | 23 (11.6) | 26 (9.8) | |
| Asian ethnicity | | | 0.087 |
| Nepali/Bhutanese | 5 (2.5) | 16 (6.0) | |
| Other Asian | 5 (2.5) | 7 (2.6) | |
| Not Asian | 151 (75.9) | 210 (79.0) | |
| Missing | 38 (19.1) | 33 (12.4) | |
| Hispanic ethnicity | | | 0.231 |
| Hispanic | 6 (3.0) | 8 (3.0) | |
| Non-Hispanic | 157 (78.9) | 225 (84.6) | |
| Missing | 36 (18.1) | 33 (12.4) | |
| Nativity | | | 0.068 |

Table 6 Continued

| Characteristic N (percent) | Enrolled <6 months (n = 199, 42.8) | Enrolled >6 months (n = 266, 57.2) | p-value |
|---------------------------------------|----------------------------------------------|----------------------------------------------|----------------|
| Immigrant | 10 (5.0) | 29 (10.9) | |
| Non-immigrant | 177 (88.9) | 219 (82.3) | |
| Missing | 12 (6.0) | 18 (6.8) | |
| Family type | | | 0.097 |
| Two-parent | 64 (32.2) | 109 (41.0) | |
| Single parent | 129 (64.8) | 146 (54.9) | |
| Other | 6 (3.0) | 11 (4.1) | |
| Primary caregiver education | | | 0.073 |
| < High school | 3 (1.5) | 14 (5.3) | |
| High school or equivalent | 70 (35.2) | 100 (37.6) | |
| Some college or equivalent | 61 (30.7) | 85 (32.0) | |
| College or higher | 43 (21.6) | 37 (13.9) | |
| Missing | 22 (11.1) | 30 (11.3) | |
| Program type | | | 0.054 |
| Home-based | 23 (11.6) | 48 (18.1) | |
| Center-based | 176 (88.4) | 218 (82.0) | |
| Eligibility type | | | 0.015* |
| Meets income guidelines | 155 (77.9) | 212 (79.7) | |
| Other eligibility type | 44 (22.1) | 45 (16.9) | |
| Missing | 0 (0.0) | 9 (3.4) | |
| Current status | | | 0.016* |
| Enrolled | 124 (62.3) | 136 (51.1) | |
| Exited | 75 (37.7) | 130 (48.9) | |

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