

Economic Analysis of Expanding Eligibility for Early Care and Education Programs in Ohio

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Executive Summary

Increasing public funding in high-quality early childhood programs has gained momentum across the United States as the body of research continues to grow on the efficacy of providing children and their families with high-quality childcare. The benefits of early care and education are often long-lasting. They include higher academic achievement, better employment options, and many other secondary effects such as improved health outcomes and reduced involvement with the criminal justice system.

The Economics Center quantified the benefits that accrue to participants of early care and education programs, avoided costs that would have been borne by participants or the community, and benefits to the State of Ohio through fiscal impacts such as earnings and sales tax revenues. Benefits calculations include findings from academic literature describing the societal and individual impacts of early care and education programs and estimates of the dollar value of the benefits received or the costs avoided. The literature reviewed emphasizes the impacts of services on early care and education programs such as academic achievements, employment opportunities, labor force participation and unemployment, public health outcomes, and impacts on the criminal justice system.

The method of analysis included a thorough literature review of multiple historical early care and education programs. The literature review spanned numerous longitudinal studies to explain historical to current practices and findings within early childhood care. The Economics Center completed a benefits analysis by applying statistically significant findings from the literature review. The findings were adjusted for inflation as well as for the location where needed.

The study area varied between an initial analysis looking at the State of Ohio and additional analyses examining and further localizing findings to seven regions within the State of Ohio. These regions included Hamilton County, Franklin County, Montgomery County, Cuyahoga County, Lucas County, Summit County, and Appalachia (a 32-region county spanning southeast Ohio).

The findings show that there are significant benefits relative to early care and education. Most notably, these benefits include increases in academic achievement, economic improvements for the individual as well as for society, significant fiscal benefits accruing to the State of Ohio, reduced public health burden, and reduced criminal justice costs. The findings were calculated in the aggregate as well as individualized to each participant annually to allow for a cost-benefit analysis to be conducted. Approximately \$155.6 million of benefits are expected to be generated within the State if an additional 9,833 children

participate in quality-rated, publicly funded early care and education programs due to expanding eligibility, or \$15,827 per participant.

The cost of expanding access to quality-rated early care and education programs from 130.0 percent to 150.0 percent of the federal poverty level in Ohio is estimated to be \$38.5 million annually. The lifetime benefit of expanding access to quality-rated early care and education for 9,833 participants is approximately \$155.6 million. Comparing the benefits to the cost of expanding access to early care and education in Ohio results in a lifetime return on investment of 404.0 percent, or approximately 10.1 percent annually over a 40-year period upon exiting from the education system. The cost savings of reduced involvement in the criminal justice system of \$107.1 million alone pays for the costs of expanding access to early care and education more than two and a half times over.

Similar findings were calculated for each of the seven regions. Generally, individuals had lifetime benefits of approximately \$15,450 - \$16,100, which are estimated to accrue over a 40-year period upon exiting from the education system.

The analysis provides detailed information regarding program outcomes by region, which could be vital in further policy and early childcare program development to better account for the relative benefits of initiatives to the associated costs.

Introduction

Increasing public funding in high-quality early childhood care and education programs has gained momentum across the United States as the body of research continues to grow on the efficacy of providing children and their families with high-quality childcare. Benefits of early childcare interventions are often long-lasting and include higher academic achievement, better employment options, and many other secondary effects such as better health outcomes and reduced involvement in the criminal justice system.

Multiple benefit-cost analyses have been conducted on several early care and education programs and have found that such early childhood programs are effective and create economic benefits to the participants, society, and government entities that far outweigh the initial costs of providing the program.

Early care and education programs have been proven to be effective in increasing participants' levels of education on average, which in turn result in higher wages, increased labor force participation, and reductions to the unemployment rate. Additionally, there are examples of secondary cost savings

for society. For example, research shows that there is a relationship between increased years of postsecondary education and reduced criminal justice costs. Additionally, findings show that increased education also results in reduced public health costs. This study explores these primary and secondary benefits of early childcare interventions.

Although early care and education programs confer many benefits, there are many institutional barriers regarding receiving childcare. While participation in childcare programs is technically available for everyone, approximately only one in five qualifying children in Ohio receive childcare subsidies. Additionally, many lower-income households must spend more than the United States Department of Health and Human Services guidelines for affordable childcare to participate in an early childhood program. These issues also affect parents and the economy more broadly as access to childcare can often be a barrier to gainful employment.

Groundwork Ohio has commissioned this benefit-cost analysis of increasing public investment in early childhood programs in the State of Ohio.

In this report, the Economics Center first reviews longitudinal studies conducted on several early care and education programs including the Abecedarian Project in North Carolina, the Perry Preschool Project in Michigan, the Brookline Early Education Program in Massachusetts, and the Chicago Child-Parent Center Programs in Illinois. Using the findings of these early care and education programs, the Economics Center localized the outcomes and quantified the benefits and costs of increasing public investment to the State of Ohio. A return on investment was calculated over the participants' lifetime which was assumed to be 40 years upon exiting from the education system.

Early Childhood Development

An individual's journey to reach his/her full social and economic potential is molded by early childhood experiences. The field of early childhood education is indebted to research pertaining to the benefits of early childhood education in the realms of economic investment and healthcare. The benefits of early education programs are often assessed through academic achievement, social adjustment, and workforce success. These factors are deeply rooted in the complex neurology of the brain. A child's individual genetic predisposition and life experiences interact dynamically to foster development.¹ Approximately 85.0

¹ Galinsky (2006)

percent of the brain's structure, including critical components such as size, growth, and the majority of its hard wiring, is formed by age four.

Early experiences are weaved into the architecture of the brain. The first three years of a child's life are crucial for brain development as it provides a framework that optimizes a child's development in various ways. The brain is specifically receptive to toxic stressors, such as poverty or physical abuse, in the early years, which can lead to extensive long-lasting damage. Toxic stressors emerging from abuse, neglect, and/or poverty alters a child's sensory and cognitive framework in a manner that impairs brain development.² In the past 30 years, extensive research has been conducted and has found that early childhood development can be negatively affected by trauma experienced by children such as extreme poverty, physical abuse, and/or sexual exploitation as well as by a lack of positive childhood experiences, including responsive caregiving.³ Additionally, socioeconomic status impacts a child's developmental outcome, specifically for cognitive development. Studies have found that, in the United States, families who belong to lower socioeconomic status secure lower scores on measures of cognitive and language skills.

Several social issues such as crime, teenage pregnancy, low educational attainment, and unemployment have roots in a child's early childhood environment. In the absence of substantial nurturing in the early years, children are highly likely to quit school, be reliant on public assistance benefits, and/or commit crimes. High-quality early care and education programs serve as a cushion against these stressors through sensitivity and responsiveness.⁴

Research has found that academic achievement gaps based on household income are present before children enter kindergarten.⁵ Disparities in cognitive, social, behavioral, and health outcomes are found in children as young as nine months and continue to widen as children get older.⁶ Children from low- to middle-income households are less likely to enter kindergarten ready to learn when compared to their peers from middle- and high-income households, as shown in Figure 1.

² Galinsky (2006)

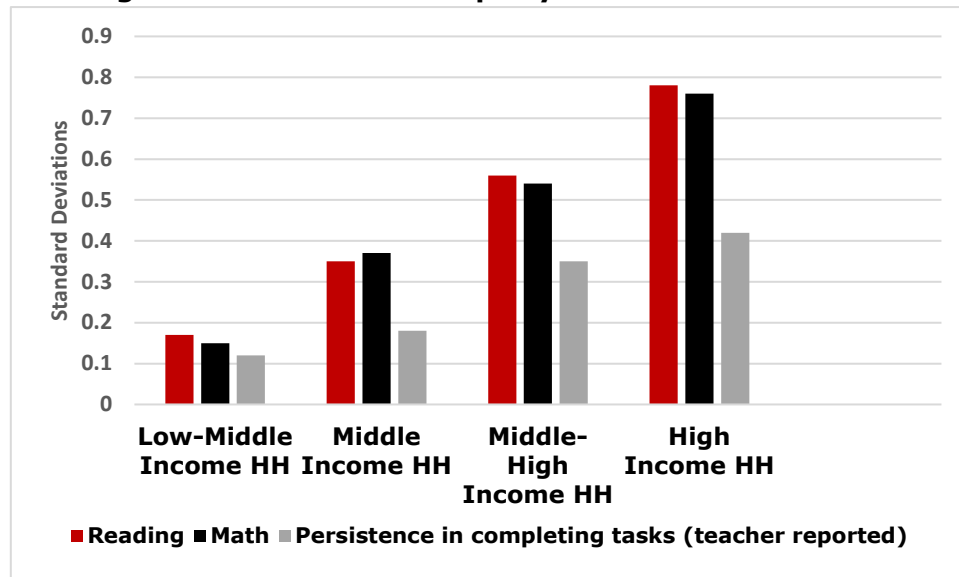
³ Levitt (2014)

⁴ Levitt, published in The Science of Early Brain Development, Wisconsin Family Impact Seminar (2014)

⁵ Bivens, Garcia, Gould, Weiss, and Wilson, (2006)

⁶ Halle et al. (2009)

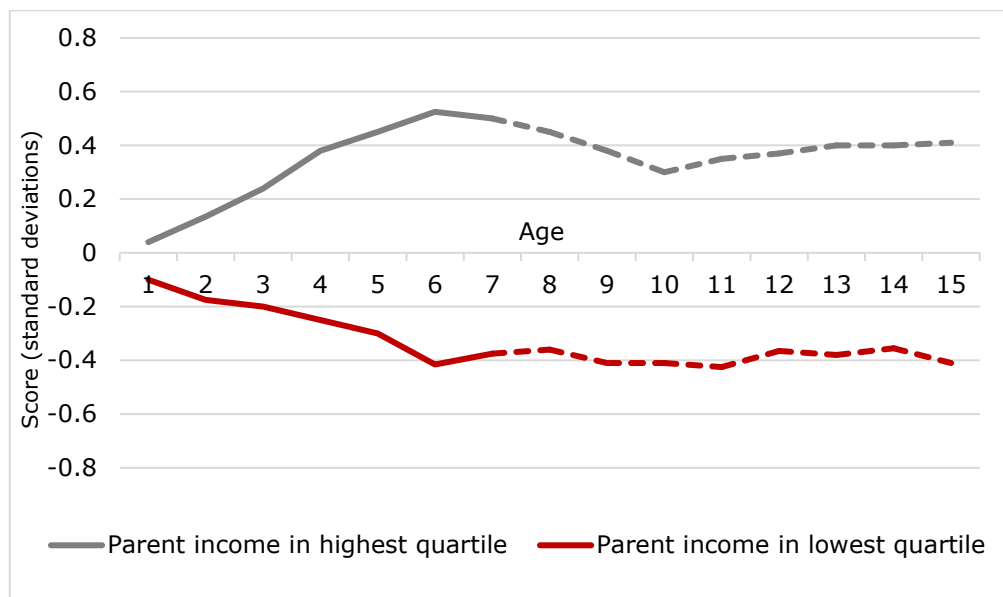
Figure 1: Achievement Gaps by Socioeconomic Status



Source: Adapted from Bivens et al. (2006)

Further, Bivens et al. (2006) concluded that the initial achievement gaps which begin prior to kindergarten persist into the teenage years, as shown in Figure2.

Figure 2: Achievement Gap by Parent Income Quartile, by Age



Source: Adapted from Council of Economic Advisors (2014) and Bivens et al. (2006)

One reason for such stark disparities in achievement between income groups is that families with higher household incomes are able to spend more money on educational activities for their children than those families from lower socioeconomic status.⁷ Duncan and Murane (2011) found that the spending gap on educational activities has widened over time between the highest and lowest income quartiles, growing from \$2,700 in 1970 to \$7,500 in 2006. While this gap has widened nominally, lower-income households have increased their spending on education as a share of their income at a greater rate than higher-income families.⁸ Public intervention is therefore needed to close existing achievement gaps between household income groups without causing undue economic stress to low-income families.

Childcare Affordability

One of the largest expenses young families face is the cost of childcare which acts, in many cases, as a barrier to employment for many parents. According to the United States Department of Health and Human Services, childcare is deemed to be affordable if it costs families 7.0 percent or less of their annual household income. In Ohio, the average cost of center-based childcare for an infant in 2019 was \$10,009, or \$1,000 less than the cost of tuition at one of the State's four-year public universities.⁹ Center-based care for two children in Ohio, an infant and a four-year-old costs \$18,267, on average.¹⁰ Infant childcare expenses comprise 11.0 percent of median annual earnings in Ohio's two-parent households (2019), while securing center-based care for an infant and a four-year-old accounts for 20.1 percent of median household earnings for a two-parent home.

Without access to childcare assistance, quality early care and education programs are often unattainable for low-income families given the disproportionate share of earnings allocated for care compared to middle- and high-income households. Working poor families just above the eligibility threshold of 130.0 percent of the federal poverty level in Ohio may be forced to place their child(ren) in a lower-cost option with a corresponding reduction in the quality of care.

When examining childcare affordability for Ohio's most economically vulnerable households, the situation becomes more dire. Two-parent households with an infant and a four-year-old living at the poverty line pay nearly two-thirds (62.6%) of their income for childcare. A single-parent household allocates

⁷ Bivens et al. (2006)

⁸ Duncan and Murane (2011)

⁹ Child Care Aware (2019)

¹⁰ Child Care Aware (2019)

approximately 80.0 percent (79.9%) of annual income for the cost of childcare for two children (an infant and a four-year-old).

Many low-income parents cannot afford quality childcare and are forced to either place their children with a lesser option or make the decision to separate themselves from the labor force. Research has shown that low-income parents, mothers in particular, who receive childcare subsidies are more likely to be employed. A report from the United States Government Accountability Office concluded that reducing the cost of childcare increases the probability that mothers will reattach themselves to the labor force. The analysis found that providing full childcare subsidy would increase labor force participation by 15.0 percentage points for mothers at or below the poverty level.¹¹ Further, Berger and Black (1992) examined the relationship between childcare subsidies and the labor supply of low-income, single mothers and found a 12.0 percentage point increase in the probability of employment between those mothers that received a childcare subsidy and those that did not.¹² The impacts of childcare affordability extend beyond Ohio's young families. Parents of children receiving care, Ohio's businesses, and government entities also experience negative effects. To combat childcare's lack of affordability some parents have chosen to exit the labor force, as the potential wages earned are offset by the high price of childcare. Additionally, some working parents have turned to less efficient, less reliable childcare options, including lower-quality centers, family, and friends. These less-than-optimal childcare options negatively impact parents' productivity at work due to disruptions related to unreliable childcare.

A nation-wide survey of working parents from households with children under the age of three was conducted by Belfield (2018). The survey found that 90.0 percent of households wanted reliability in a childcare program so that work commitments could be met.¹³ Belfield's survey also found that working parents lost two hours per week of work time due to inadequate childcare. Further, two-thirds of respondents indicated they have had to leave work early; more than half of working parents indicated they were late for work, missed a full day of work, or were distracted at work; and one-third reported missing part of their daily work shift due to inadequate childcare.¹⁴ Approximately 8.0 percent of survey respondents indicated they had been fired from their job due to childcare issues, 7.0 percent stated they had been demoted to a less desirable position, and 13.0 percent reported they had quit their job over childcare problems.¹⁵

¹¹ GAO/HEHS-95-20 Childcare Subsidies

¹² Berger and Black (1992)

¹³ Belfield (2018)

¹⁴ Belfield (2018)

¹⁵ Belfield (2018)

As detailed in Table 3, the economy is negatively impacted when workers are not as productive due to inadequate or unreliable childcare as they otherwise would be. Businesses experience lower revenues and economic output, have additional costs to fill vacancies and absenteeism, as well as experience reduced revenue in the future due to lower productivity and output. Governments are impacted through lost tax revenue due to reduced earnings and consumption spending.

Table 3: Negative Impacts on the Economy from Childcare Issues

Working Parents	Businesses	Government
Lost earnings from lower productivity	Lower revenue from lower output	Lost tax revenue from lower GDP
Extra costs of job search for alternative work and childcare arrangements	Extra costs to rehire and from covering absenteeism Extra costs to manage disrupted workers	Lost sales tax revenue
Lost future earnings from lower productivity	Lower future revenue from lower output	Lost future tax revenue

Source: Belfield (2018)

Eligibility for Childcare Assistance in Ohio

The Childcare and Development Fund through the United States Department of Health and Human Services provides funding to states to support low-income households to pay for care. In Ohio, families at or below 130.0 percent of the federal poverty level qualify to receive the assistance. Families remain eligible to retain a portion of the assistance up to 300.0 percent of the federal poverty. While childcare assistance offsets the cost of early care and education programs for many economically fragile households, others are not eligible to receive the benefit. Families earning more than 130.0 percent of the federal poverty level prior to needing childcare assistance are not eligible to enroll, creating a disincentive for many to fully attach themselves to the labor market or seek career advancement.

Currently, households are eligible to apply for childcare assistance based on income, employment, citizenship, and other factors. The income requirement, however, is variable in terms of initial eligibility and ongoing eligibility. Households are eligible to apply for child care if their initial gross monthly household income is less than 130.0 percent federal poverty level. However, households maintain eligibility up until their household earns more than 300.0 percent federal poverty level. This means that a family, if initially eligible, can more than double their household income and maintain eligibility. The system as it currently stands creates potential inequities in terms of access to publicly funded child care for households that initially earn more than 130.0 percent federal poverty level. Therefore, the Economics Center sought to analyze the potential impact of increasing initial eligibility for childcare assistance from 130.0 percent of the federal poverty level to 150.0 percent.

To evaluate the level of need regarding early care and education, the Economics Center analyzed data from the Integrated Public Use Microdata Series (IPUMS)¹⁶. This benefit analysis was completed for children in households that earn between 131.0 percent to 150.0 percent of the federal poverty level and were not enrolled in an early care and education program. This analysis resulted in 9,833 children that were not participating in an early care and education program but are in households between 131.0 percent to 150.0 percent of federal poverty level.

Increasing the eligibility of subsidies would also allow more parents to reenter the workforce, especially single parents. This would have broad implications on poverty reduction as well as significantly increase fungibility of household expenditures due to reduced burden of childcare costs on households. By utilizing research from the Urban Institute, the Economics Center modeled these employment effects on the State of Ohio. While parents may reenter the workforce due to increased access to childcare, not all parents would do so. Therefore, an elasticity coefficient is necessary to capture these effects. Based on analysis by the Urban Institute and The National Academies of Sciences, Engineering, and Medicine Committee on Building an Agenda to Reduce the Number of Children in Poverty by Half in 10 Years (2019), the Economics Center applied a reduction factor in terms of households returning to the workforce of approximately 2.0 percent increased employment for every 10.0 percent reduction in the price of childcare.¹⁷ The findings of the previously mentioned studies found that should childcare subsidies be expanded from 130.0 percent of the federal poverty level to 150.0 percent of the federal poverty level,

¹⁶ IPUMS USA, University of Minnesota, www.ipums.org

¹⁷ Urban Institute (2019)

approximately 3,900 single mothers in Ohio would be able to reenter the workforce, resulting in 2,800 children being lifted out of poverty.

The Economics Center modeled scenarios where a household could experience benefits should the initial access to publicly funded childcare be expanded from 130.0 percent of federal poverty level to 150.0 percent federal poverty level. One scenario modeled is a two-person household in which one person is working full-time, earning approximately \$15.50 an hour or \$32,240 per year. The other adult is currently in school full-time. They are currently at nearly 200.0 percent of the federal poverty level. Should this household have a child, their federal poverty level would drop to just under 150.0 percent of the poverty level. Since that exceeds 130.0 percent of the federal poverty level, they are not eligible for childcare assistance under current guidelines. While the household income did not change, household costs do. If this household required the use of full-time child care at a Center, they would incur an additional annual cost of approximately \$11,000 for infant care. Should we recalculate the household's earnings as earnings after the reduction of the burden of childcare, their estimated household income would be approximately \$21,000, which is less than 100.0 percent of the poverty level for a household of three individuals. The State of Ohio expanding initial eligibility of childcare subsidies would enable this household to maintain livelihood at approximately 150.0 percent of the federal poverty level.

Another example of a household that would benefit from expanding eligibility for childcare subsidies is a household with two working-age adults and two children. One of the working-age adults is a stay-at-home caregiver for the two children. This household currently earns approximately \$40,000, which is slightly more than 150.0 percent poverty for a household of four individuals. This household does not qualify for childcare assistance. If this household has a third child, their annual household earnings would just exceed the 130.0 percent poverty level, meaning they would still be ineligible for childcare assistance since their earnings exceed the federal poverty level threshold. If that initial eligibility increased to 150.0 percent, this household would then be eligible as a household of five individuals, and both working-age adults could work full-time. If this occurred, and the second adult also earned approximately \$40,000, the household would still maintain their childcare assistance with a combined household income of \$80,000, or 260.0 percent of the federal poverty level. This increase in household income, along with the addition of another family member, could enable this household to improve living arrangements and/or become homeowners. For example, based on a household not exceeding 30.0 percent of household income on rent or a mortgage, this household could go from a

maximum of \$1,000 per month in rent (for a family of five) to \$2,000 per month.

Assessing Childcare Quality in Ohio

In addition to ensuring the affordability of early care and education programs, it is also important that such programs are of high quality. The State of Ohio assesses quality of care using Step Up to Quality, or SUTQ, a rating and improvement system for early learning and development programs administered by the Ohio Department of Education (ODE) and the Ohio Department of Job and Family Services (ODJFS). The State of Ohio has administered the system statewide since 2006 and updated the program in 2012 to create a single framework for quality that applies to all early learning and development programs. Today, all early learning and development programs receiving public funds must participate in Step Up to Quality as a condition of funding. Step Up To Quality awards “star ratings” corresponding to each level of achievement, with each program receiving between one and five stars. The program standards are organized across four domains: learning and development, administrative and leadership practices, staff qualifications and professional development, and family and community partnerships. Step Up To Quality ratings are posted publicly online for parents to access and choose a program that is best for their child. For a program to advance to the next level of a star rating, programs in levels one, two, and three must meet all standards as defined by the State of Ohio. In order for a school to achieve a four- or five-star rating, they must at minimum meet all three-star requirements and achieve at least one point in each of the four domains. Four-star programs must score between 35 and 55 points across all domains and five-star programs must score between 56 and 79 points. The following table presents an overview of SUTQ’s defined standards by level of achievement and domain. Each subsequent star rating builds upon preceding levels; as such, a requirement of a preceding level should be assumed to be required for succeeding levels.

In its analyses, the Economics Center used a star rating of three or higher as a definition of quality care. Table 2 below outlines how SUTQ rates the quality of early care and education programs.

Table 2: Ohio Step Up To Quality Rating System

	One Star	Two Stars	Three Stars	Four/Five Stars
<i>Learning and Development (max. 21 points)</i>	Program engages in process to <u>create</u> a curriculum and select a screening tool; <u>selects</u> class self-assessment tool	Program <u>obtains</u> curriculum and screening tool; <u>completes</u> class self-assessment tool	Program <u>implements</u> curriculum and screening tool; identifies ways to improve; provides positive learning environment and interactions	Teachers plan purposeful activities (5 pts) and support children's active engagement (3 pts); use assessment to adjust instructions (5 pts) and communicate with families (4 pts); document progress (4 pts)
<i>Administrative and Leadership Practices (max. 18 points)</i>	Program has written wage structure; <u>completes</u> self-assessment; all staff has professional development plans	Program offers <u>1</u> approved staff supports; <u>uses</u> self-assessment to create <u>1</u> goal with <u>1</u> action step for improvement; teachers have <u>1</u> observation	Program offers <u>2</u> approved staff supports; creates <u>2</u> goals with <u>2</u> action steps for improvement; <u>use</u> observation results for professional development	Program offers <u>3</u> approved staff supports (3 pts), identifies ways to engage community partners (3 pts); has annual survey or meeting (3 pts); uses results to inform improvement plans (3 and 4 pts); conducts <u>2</u> observations (2 pts)
<i>Staff Qualifications and Professional</i>	Administrator has CDA credential, associate's	Administrator has an AA or other approved education;	Administrator has an AA or other approved education; <u>50%</u>	Education above requirements for three stars yields additional

<i>Development (max. 16 points)</i>	degree (AA), or other approved education; <u>50%</u> of lead teachers have a <u>CDA</u> or 1 lead teacher has an AA or other approved education; all staff complete SUTQ certificate and required coursework	<u>25%</u> of lead teachers have an <u>AA</u> or other approved education	of lead teachers have an AA or other approved education	points for administrators (2-5 pts), lead teachers (3-5 pts), and assistant teachers (1-4 pts); 50-100% of staff achieve various higher tiers for SUTQ certificate (1-3 pts)
<i>Family and Community Partnerships (max. 8 points)</i>	Program gives written <u>information</u> to families on children's transitions; Obtains information about family structure and routines; Provides information on 2 resources and community services	Program gives <u>activities</u> for children in transition; transfers child's records; communicates with families; provides families health and child development <u>information</u> ; offers activity for families to engage	Program develops <u>transition plan</u> with families; offers 1 event for family engagement, has <u>written policies</u> to ensure health screenings with procedures for referral process	Program has written transition policies (2 pts); has 2 written agreements with community partners (3 pts); uses formal model to enhance family engagement (2 pts); has active parent volunteer group (1 pt)

Source: State of Ohio

Note: Optional extra points can be awarded to schools seeking four or five stars if the program is accredited from an approved accrediting body (5 points) as well as if the school meets defined teacher to student ratios for infants (2-3 points), toddlers (2-3 points), preschoolers (1-2 points), and school-age children (1-2 points).

Literature Review of the Benefits of Early Childhood Care and Education Programs

Early Care and Education

Early care and education is a diverse concept characterized by “differences in target groups” ranging from the broader agendas such as health promotion, disease prevention, early childcare, and preschool education to the “highly specialized challenges” that are brought forward by developmental disabilities, economic turmoil, child abuse, and mental health problems including child psychopathology, maternal depression, and parental substance abuse.¹⁸ Many researchers have investigated the impact of early care and education programs on schooling and adult outcomes. It has been shown empirically through various studies that investing in programs for children from birth to age five aids in closing the achievement gap, decreases the need for special education, increases the chance of leading a healthier lifestyle, reduces crime rates, and lowers overall societal costs.

Early Care and Education Programs

There is an extensive body of research on early care and education programs. While there is a robust collection of findings on early childhood programs’ impacts, most academic studies are centered upon several interventions. The Economics Center has used the following programs as the foundation of its literature review and analysis: the Abecedarian Project, the Brookline Early Education Project, the Chicago Child-Parent Centers Program, the Colorado Preschool Program, and the High/Scope Perry Preschool Program. Detailed descriptions of these programs can be found in the report’s appendix. Each of these early care and education programs described below has been rigorously evaluated, longitudinal research has been completed, and data have been collected on participants beginning at birth and continued through adulthood. While the analysis primarily utilizes these programs, the report also references several meta-analyses, which include additional peer-reviewed early childhood and educational programs.

A number of academic studies show that early childhood care and education is associated with a host of benefits to students, schools, and society at large. Some benefits accrue in the short term while the child is participating in an early childhood program. Some benefits accrue in the medium term as the child progresses through school. Others accrue into adulthood, with entry into the

¹⁸ Institute of Medicine and National Research Council (2000)

labor force. A meta-analysis of 11 evaluations of early childhood interventions found that such programs provide significant benefits to children and their families while also decreasing costs associated with public assistance programs, involvement in the criminal justice system, and others.¹⁹

Education Benefits

The educational impacts of early childhood programs have been found to provide children with benefits in the short-term as they progress into kindergarten, in the medium-term in grade school, and longer-term benefits are manifested in adulthood through improved high school and postsecondary education completion which likely leads to better employment outcomes. The preschool experience increases intellectual ability at kindergarten entry, which then improves academic motivation, thereby reducing the need for special education placements.²⁰ Further, improved motivation in school led to increases in the highest year of school completed, which leads to increased wages and reduces the likelihood of involvement in the criminal justice system.²¹

According to data from the Early Childhood Longitudinal Study (ECLS) on reading and math tests in kindergarten, children from center-based care show the highest scores in comparisons with care provided by parents, relatives, non-relatives, or in mixed settings. The ECLS dataset shows that children who attend center-based preschool report test scores that are 0.3 standard deviations higher than other children. Preschool attendance increased math/reading scores by 0.1 standard deviations in the first school year, with persistent academic gains for children from low-income families.²² The improvement in academic achievements due to participation in early childhood education programs comes from both individual gains (as a result of being more proficient in school) and from peer effects (as other students who are more proficient contribute to a positive learning environment). A meta-analysis of 125 studies confirms that early care and education programs provide short-term impacts on children's cognitive, school, and social skills, as it found overall effect sizes of .23, .14, and .16 for cognitive, school, and social skills, respectively, immediately upon exiting from early childhood programs.²³ Further, quality early care and education programs have been found to be positively associated with increased academic achievement and social functioning beyond the early childhood years.²⁴

¹⁹ Karoly et al. (1998)

²⁰ Schweinhart (2003)

²¹ Schweinhart (2003)

²² Magnuson et al. (2004)

²³ Camilli, Vargas, Ryan, and Barnett (2010)

²⁴ Vandell, Burchinal, and Pierce (2016)

Grade retention and special education services are two markers of success widely used to determine the efficacy of early care and education programs. One program found that preschool was associated with an average of approximately 50.0 percent reduced need for retention in kindergarten through third grade, with the most significant impact found in first grade with a 67.0 percent reduced need for retention.²⁵ Another program found that participants were 15.4 percentage points less likely to have been retained by age 15 (23.0 percent for treatment compared to 38.4 percent for control).²⁶ These documented outcomes are consistent with a meta-analysis that found that grade retention was reduced by 6.0 percent and 23.0 percent (representative estimate of 21.0%), associated with cost savings to school districts of between \$193 and \$785 per student.²⁷ Early childhood care and education is also associated with lower utilization of special education services. Preschool graduates of one program were 5.0 percent less likely to be identified as having a significant reading disorder (SRD) in first through third grade. The highest impact on SRDs was found at the end of kindergarten for children who participated in a CPP preschool, at which point they were 26.0 percent less likely to be identified with an SRD.²⁸ As a whole, early childhood care and education is associated with between a 6.0 percent and 48.0 percent (representative estimate of 12.0 percent) reduction in special education placement.^{29, 30} A meta-analysis found that cost savings from such reduced special education ranged from \$2,060 to \$7,996 per student.³¹

Finally, early childhood care and education programs are associated with statistically significant higher high school (including GED) graduation rates. Longitudinal studies measuring graduation rates found that treated participants were between 11.2 and 12 percent more likely to have received a high school diploma than students in the control group.^{32,33} Further, a study of the Chicago Child-Parent Center Program concluded that the treatment group had a significantly lower high school dropout rate and had completed more years of education. A 19-year follow-up of participants found that the treated individuals were 47.0 percent more likely to have attended a four-year college compared to the control population.³⁴ A meta-analysis of early childhood care and education

²⁵ Colorado Department of Education (2020), referencing the Colorado Preschool Project.

²⁶ Reynolds et al. (2002), referencing the Chicago Child-Parent Center Program.

²⁷ Belfield (2004)

²⁸ Colorado Department of Education (2020), referencing the Colorado Preschool Project.

²⁹ Karoly et al. (2005), referencing the Chicago Child-Parent Center Program.

³⁰ Belfield (2004)

³¹ Belfield (2004)

³² Reynolds et al. (2001), referencing the Chicago Child-Parent Center Program.

³³ Colorado Department of Education (2020), referencing the Colorado Preschool Project.

³⁴ Reynolds et al. (2007)

programs quantified the associated decrease in special education participation as \$447 per student in 2012 dollars.³⁵

Economic Benefits

The economic benefits of early childhood programs result in increased employment and earnings, reduced need for public assistance, reduced involvement with the criminal justice system, and increased parental labor force participation. Early childhood programs have been found to result in increased economic self-sufficiency for parents of treated children initially (and later for the children), through greater labor force participation, increased earnings, and decreased need for public assistance programs.³⁶ Investments in education or human capital stimulate economic growth.³⁷ There are several channels through which early childhood programs provide economic benefits to participants, the government, and society. Many of the economic benefits detailed here carry on even after any cognitive gains have faded.³⁸ While children from all socioeconomic statuses may benefit from participating in early childhood programs, research has widely concluded that the economic benefits resulting from participation in early childhood programs are the greatest for children from the most economically fragile homes.³⁹

Employment and Earnings

A longitudinal study found that treated participants were 14.0 percent more likely to be employed at age 21 compared to the control group (64.0 percent compared to 50.0 percent).^{40, 41} While the employment rate between the groups was not significant, the 23.0 percentage point difference of those holding skilled jobs was, with 67.0 percent of the treatment group employed in a skilled occupation compared to 41.0 percent of individuals in the control population.⁴² Another study found that treated participants were 12.0 percent more likely to report being employed at age 27 compared to the control group (71.0 percent compared to 59.0 percent).⁴³ The median monthly earnings for this treatment population were \$1,219 (2001\$) and the control group reported median monthly wages of \$766 (2001\$).⁴⁴ Notably, the positive effects on employment and earnings from this intervention impacted males and females differently. For

³⁵ Kay, N., & Pennucci, A. (2014)

³⁶ Karoly et al. (1998)

³⁷ DeLong, Goldin, and Katz (2003)

³⁸ Karoly et al. (2005)

³⁹ Karoly et al. (2005)

⁴⁰ Campbell et al. (2012), referencing the Abecedarian Project

⁴¹ Barnett and Masse (2007), referencing the Abecedarian Project

⁴² Campbell et al. (2012), referencing the Abecedarian Project

⁴³ Karoly et al. (2005), referencing the Perry Preschool Project

⁴⁴ Karoly et al. (2005), referencing the Perry Preschool Project

males, the treated group had better-paying jobs as 42.0 percent reported monthly earnings of at least \$2,000 (2001\$) compared to only 6.0 percent of males from the control. Females from the treatment group had a vastly higher rate of employment compared to the control females at 80.0 percent and 55.0 percent, respectively. Further, a meta-analysis of early childhood programs found that treated individuals are associated with a \$25,983 increase in lifetime earnings via increased high school graduation rates.⁴⁵

Reduction in Public Assistance Utilization

Longitudinal analysis of The Chicago Child-Parent Centers Program found that the program provided a reduction in the need for public assistance programs. Approximately 59.0 percent of treated individuals, at age 24, had accessed public assistance programs (TANF and Medicaid), compared to 64.0 percent of the control population.⁴⁶ While not statistically significant, this does represent a 5.4 percentage point reduction in accessing and utilizing public assistance programs. A follow-up of participants at age 26 found a statistically significant reduction in the number of months accessing food assistance as the control group had accessed food assistance approximately 19 months between the ages of 18 to 24, while the treated population reported utilizing food assistance for 17.5 months (1.28-month reduction).⁴⁷

Reduction in Involvement with the Criminal Justice System

Early care and education programs have also reduced participants' involvement with the criminal justice system. By age 18, individuals that received treatment from the Chicago Child-Parent Center Programs were significantly less likely to be involved with the juvenile justice system. Approximately 17.0 percent (16.9%) of treated participants had petitions to juvenile court for non-violent offenses, while 25.1 percent of individuals from the control group had involvement with the juvenile court.⁴⁸ Further, 9.0 percent of the treatment population had involvement with the juvenile court for violent offenses, compared to 15.3 percent of the control group, meaning the program significantly reduced adolescent involvement with the juvenile justice system for violent offenses by 6.3 percentage points.⁴⁹ Treated individuals also had a significantly lower rate of felony arrest at 16.5 percent compared to the control population's rate of 21.1 percent, or a 4.6 percentage point reduction.⁵⁰ At age 24, the incarceration rate of treated subjects was also significantly lower than

⁴⁵ Kay, N., & Pennucci, A. (2014)

⁴⁶ Reynolds et al. (2007)

⁴⁷ Reynolds et al. (2007)

⁴⁸ Karoly et al. (2005)

⁴⁹ Karoly et al. (2005)

⁵⁰ Reynolds et al. (2007)

that of the control group, 20.6 percent and 25.6 percent, respectively.⁵¹ Similarly, the High/Scope Perry Preschool Program found that participants were 46.0 percent less likely to have been arrested in their lifetime compared to non-participants. Additionally, 32.0 percent of the program group compared with 48.0 percent of the control group had been arrested for one or more violent crimes by the age of 40, representing a 16.0 percentage point reduction in violent crime arrest.⁵² A meta-analysis quantified such per participant effects as \$4,907 (2014\$) savings from reduced crime.⁵³

Reduction in Child Maltreatment and Out of Home Placement

Participation in early care and education programs has been positively correlated to reducing child abuse and neglect and placements into care outside of the home. Treated individuals from the Chicago Child Parent Centers Program were found to be less likely to have experienced any child abuse or neglect between the ages of 4 to 17 when compared to the control population, 9.9 percent and 17.4 percent, respectively. Further, children in the control group experienced out-of-home placements at a greater rate than that of the treated population. Participation in the program resulted in a 3.3 percentage point reduction in out-of-home placements for the treatment group compared to the control (5.2% and 8.5% respectively).

The findings of the Chicago Child Parent Centers Program are supported by a multilevel meta-analysis of evaluation studies of 40 early care and education programs for children at risk for physical child abuse and neglect using non-randomized designs. The studies took place between 1975 and 2002 and evaluated programs focused on the prevention of child abuse and neglect starting at birth or in the first three years of life. The overall positive effect with in-study and between in-study equals 0.29, which indicates that early care and education programs for children at-risk for child abuse and neglect have a significant effect reducing the likelihood of such adverse childhood experiences.

Health Benefits

An extensive amount of research has found that illnesses in adults are more prevalent and problematic among individuals that have had adverse childhood experiences.⁵⁴ As such, through a reduction in adverse childhood experiences, early childhood care and education programs have been associated with lasting impacts on participant's health. A meta-analysis of programs associated a child's

⁵¹ Reynolds et al. (2007)

⁵² Schweinhart (2007)

⁵³ Kay, N., & Pennucci, A. (2014)

⁵⁴ Campbell et al. (2014)

participation in early childhood care and education with \$1,063 in lifetime savings in reduced health care costs via education, in 2012 dollars.⁵⁵

Tobacco Use and Substance Abuse

The Chicago Child Parent Centers Program has been found to positively impact behavioral risk factors, including smoking. Treated males were found to have a lower lifetime prevalence of smoking and substance abuse. While not statistically significant, treated individuals reported lower rates of daily tobacco use compared to the control population.⁵⁶ The share of daily tobacco users in the treatment group were 4.2 percentage points lower than the control group, 17.9 to 22.1 percent respectively.⁵⁷ Although this outcome is not statistically significant, it worth including given the implications of daily tobacco use as approximately 50.0 percent of all long-term smokers are expected to die from a smoking-related disease.⁵⁸

Further, participation in Chicago Child Parent Centers Program has been found to significantly reduce the number of individuals reporting substance abuse. At the age 26 follow-up, 14.3 percent of the treated population had indicated substance misuse compared to 18.8 percent of the control population, or a significant reduction of 4.5 percentage points.⁵⁹

Receiving Health Care

Treated participants in one early childhood care and education program were significantly more likely to have health insurance compared to their non-treated counterparts by age 26, 76.7 percent and 66.6 percent, respectively.

A longitudinal study of another early care and education program found that males from the treatment group follow-up were also more likely to receive care from a doctor or hospital when sick, as 81.5 percent indicated as much at the age 30 follow-up, contrasted against approximately half (52.4%) of the control group, for a statistically significant difference of 22.8 percentage points. Males were also significantly less likely to have ever been hospitalized when compared to their non-treated peers, 21.0 percent and 56.0 percent, respectively.⁶⁰

⁵⁵ Kay, N., & Pennucci, A. (2014)

⁵⁶ Conti et al. (2016)

⁵⁷ Reynolds et al. (2011)

⁵⁸ United States Department of Health and Human Services (2010)

⁵⁹ Reynolds et al. (2011), referencing the Chicago Child-Parent Center Program

⁶⁰ Conti et al. (2015), referencing the Abecedarian Project

Multi-Generational Benefits

The benefits of early intervention programs transfer across generations and have significant impacts on intelligence, academic achievement, educational attainment, earnings, health, profession, and reduction in public assistance utilization of future generations.

In addition to the increased years of education and educational attainment experienced by children in treatment groups, mothers of the treated children also benefitted. By the time treated children were 4.5 years old, mothers in one program were already more likely to have completed high school and participated in some form of postsecondary education. Mothers of children participating in the intervention were also more likely to be employed and more likely to have a semi-skilled or skilled job.⁶¹

The benefits of early childhood programs extend beyond the participants and their parents. One study examining the intergenerational and intragenerational benefits of early childhood care and education found statistically significant intergenerational treatment effects for the children of the original participants in terms of educational attainment, employment, and crime.⁶² The children of the treated participants at approximately 21 years old were 30.0 percentage points.⁶³ The treatment group was found to be more likely to have a high school diploma (or equivalent) and be employed when compared to the children of the original control population, 56.0 percent and 36.0 percent, respectively. Further, children of the treated group were more likely to be employed full-time or self-employed, 59.4 percent contrasted against 42.3 percent for the control group. The treatment effect on the likelihood of being arrested was approximately 20.0 percentage points.⁶⁴

Overall Benefits

The extensive body of research on the benefits of quality childhood programs has widely concluded there are numerous positive educational, economic, and health-related outcomes for children that persist well into adulthood.

Early care and educational programs are associated with a variety of educational benefits including higher test scores, decreased grade retention and special

⁶¹ Karoly et al. (1998), referencing the Abecedarian Project

⁶² Heckman and Karapakula (2019), referencing the Perry Preschool Project

⁶³ Heckman and Karapakula, referencing the Perry Preschool Project, included an augmented inverse probability weighting for the estimate of the treatment effect to account for non-response, imbalance in participants' preprogram covariates between groups and participants fertility differences for having a child in the specified age group.

⁶⁴ Heckman and Karapakula (2019), referencing the Perry Preschool Project

education services, and increased graduation rates. Program participants are also more likely to be employed and with higher earnings than non-participants and are less likely to receive public assistance, have contact with the criminal justice system, and experience child maltreatment. Further, care and educational programs are associated with a decreased likelihood of tobacco use or substance abuse and an increased likelihood of having health insurance and receiving medical care. Additionally, the benefits associated with quality early care extend beyond the early learners as research has shown that parents are more likely to enter (or reenter) the labor force if they have access to reliable, quality early care.

Because of the extensive benefits associated with quality care and education, multiple meta-analyses have concluded that the associated quantified benefits far exceed the cost of programming. In fact, such programs are among the most cost-effective educational interventions, creating positive returns to the families directly impacted and to society at large.^{65, 66}

Methodology

The Economics Center quantified the benefits which accrued to those children participating in early care and education programs, avoided costs that would have been borne by participants as well as benefits to the State of Ohio through various fiscal impacts such as earnings tax collections and sales tax. Benefit calculations include findings from academic literature describing the societal and individual impacts of early childhood interventions as well as calculations of the dollar value of the benefits received or the costs avoided.⁶⁷ The literature reviewed emphasizes the impacts of services on early childhood interventions such as academic achievements, employment opportunities, labor force participation and unemployment, public health outcomes, and impacts on criminal justice.

Data were used primarily from IPUMS USA and the Bureau of the Census as well as additional education data from the State of Ohio, various tax data, and models created by the Economics Center to quantify the benefits of program participation as well as additional outcomes such as sales tax generation from increased household earnings and spending.

The methodology for calculating the benefits and costs avoided for each program or service varied. Where appropriate, the Economics Center adjusted dollar

⁶⁵ Kay and Pennucci (2014)

⁶⁶ Yoshikawa et al. (2013)

⁶⁷ Data for costs and benefits dollar amounts were collected through literature review, as well as local, state, and federal sources.

amounts found in the academic literature for inflation, using the Consumer Price Index (CPI). Additional localization adjustments were made specifically for both retail sales activity to better capture how much local spending remains local as well as robust data regarding educational attainment, labor force participation, and unemployment. The Economics Center prepared the benefits as both a total as well as individualized per participant per year to best account for various funding structures.

Benefit Analysis for the State of Ohio

The Economics Center quantified a number of the benefits of early childhood intervention explored above and calculated estimated benefit-costs of interventions relative to the personal and communal impact benefits derived over the lifetime of participants. The Economics Center estimated the number of children in Ohio living in households with income between 131.0 percent and 150.0 percent of the federal poverty level and not currently enrolled in an early care and education program. Approximately 18.0 percent, or 9,833, children in Ohio between the ages of 3 and 4, live in households between 131.0 percent and 150.0 percent of the federal poverty level and are not currently enrolled in an early care program.

Using this sample population, the analysis provided information on the annual benefits derived from expanding initial eligibility from 130.0 percent to 150.0 percent of the federal poverty level.

Education and Employment

The Economics Center applied the improved academic outcomes to the sample population to estimate the marginal impacts that can be expected for high school graduation, college attendance, and college graduation, as well as expected earnings impacts from the increased academic achievement. Table 3 shows the impacts on educational attainment.

Table 3: Improved Academic Achievement in Ohio from Increased Public Investment in Early Childhood Programs

Marginal Differences in Academic Achievement in Ohio	
Non-completion of High School	(1,075)
High School Graduates	705
College Graduates	370

Source: Economics Center's calculations using outcomes from the literature review and Ohio high school and college attendance and graduation rates.

As a result of increased eligibility to access quality-rated early care and education programs, an estimated 1,075 students who otherwise would have dropped out will graduate from high school, and an additional 370 students will graduate from a four-year college. These findings have direct impacts on lifetime earnings and productivity, fiscal contributions due to earnings taxes and sales taxes, and decreased public health costs.

Based on Census data for the State of Ohio⁶⁸ individuals with less than a high school education earn \$22,929 per year, on average, high school graduates have an annual average wage of \$31,372, and college graduates make \$52,613 per year, on average. This analysis included applying the varying rates of both labor force participation by education as well as associated unemployment rates. Table 4 shows the labor force participation and unemployment rates for August 2019 (a time of economic stability pre-pandemic).⁶⁹

Table 4: Ohio Labor Force Participation and Unemployment by Educational Attainment

Educational Attainment	Labor Force Participation	Unemployment
No High School Diploma	54%	12.9%
High School Diploma	73%	5.2%
Bachelor's Degree	88%	1.9%

Source: Data.Census.Gov

The estimated impact of the increased educational attainment results in approximately \$20.5 million in additional earnings or approximately \$2,082 per participant. In addition to the individuals benefiting, the State of Ohio would also see increased income tax and sales tax revenue from the participants. In total, the State would receive an estimated \$500,790 based on the average earnings by educational attainment (factoring in labor force participation and unemployment). The State would also receive an estimated \$196,936 in additional sales tax revenue.⁷⁰

Ohio Works First

The Economics Center calculated the reduced utilization of TANF, specifically Ohio Works First (OWF) for the State of Ohio. Based on an average monthly payment amount of \$210,⁷¹ the Economics Center found that the increased educational attainment and earnings translates to a reduction of approximately

⁶⁸ 2018 1-year estimates

⁶⁹ <https://www.bls.gov/news.release/empsit.t04.htm>

⁷⁰ Sales Tax calculations were only calculated for those individuals who were estimated to participate in the labor force and be employed.

⁷¹ <https://jfs.ohio.gov/pams/Case-Load-Summary-Report-October-2018.stm>

\$3.7 million of state spending required for OWF. There would be approximately \$378 less spent per participant as a result of increased eligibility in accessing quality-rated early care and education programs in Ohio.

Reduction in Criminal Justice Costs

Research has found statistical differences in levels of criminality between treatment and control groups. Based on an analysis of Perry Preschool's lifetime reduction in crime and involvement with the criminal justice system, the Economics Center estimated that there was a difference of approximately \$20,580 and \$710 for lifetime criminal justice system costs for males and females, respectively. These individual differences amount to a total lifetime cost savings due to reduced involvement with the criminal justice system of more than \$107.1 million, or approximately \$10,900 per treated participant over his/her lifetime. The findings were annualized over a 40-year period in which these individuals are most likely to be employed.

Reduction in Public Health Costs

Educational attainment, in addition to impacts on employment and earnings, also had implications on the levels of utilization of public health costs.⁷² An individual without a high school diploma was found to create approximately \$3,140 per year in public health burden, whereas a high school graduate was associated with \$1,163 and a college graduate only \$198. Based on the marginal differences in educational attainment, the public health burden would be reduced by approximately \$2.5 million or \$253 per participant.

Reduction in Grade Retention and Special Education Costs

The Economics Center calculated the expected cost savings of quality early care and education on reduced grade retention and reduced need for special or supplemental education for participants. Based on reduced instances in both grade retention and special or supplemental education, the Economics Center found substantial savings in the costs of education.

For grade retention, the expected savings is approximately \$12.3 million in total, or more than \$1.0 million annualized over the years of the participants' primary and secondary education. Similarly, savings for reduced special or supplemental education would be nearly \$8.9 million in total, or approximately \$738,400 annualized over the participants' years of primary and secondary education.

Considering the many positive economic, educational, societal, and health benefits of early childhood programs, each child that participates across the

⁷² Mitra, 2010

State of Ohio is estimated to generate approximately \$15,827 in benefits over an assumed 40-year period. Table 5 details the annual amount for each of the benefit categories.

Table 5: Total Benefit per Early Childhood Program Participant

Total Benefits for the State of Ohio	
Total Participants	9,833
Marginal Differences in Academic Achievement	
Non-completion of High School	(1,075)
High School Graduates	705
College Graduates	370
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$20,467,761
Additional Income Taxes	\$500,790
Additional Sales Tax	\$196,936
Total Cost Savings	
Reduction in Public Health Burden	\$2,483,109
Reduction in Grade Retention Costs	\$12,287,016
Reduction in Special Education Costs	\$8,860,764
Reduction in Ohio Works First	\$3,716,874
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$107,112,062
Total Benefits and Cost Savings	\$155,625,312
Total Benefit per Early Childhood Participant	
Increased Income	\$2,082
Ohio Income Tax	\$51
Ohio Sales Tax	\$20
Ohio Works First	\$378
Crime Reduction	\$10,893
Public Health Savings	\$253
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$15,827

Source: Economics Center's calculations using IPUMS data and outcome data collected through academic literature.

The estimated cost of expanding access to quality-rated early care and education programs from 130.0 percent to 150.0 percent of the federal poverty level is

\$38.5 million annually.⁷³ The lifetime benefits created by expanding access to quality-rated early care and education for 9,833 individuals is approximately \$155.6 million. Comparing the benefits to the cost of expanding access to quality-rated early care and education programs in Ohio results in a lifetime return on investment of 404.0 percent, or approximately 10.1 percent annually. The cost savings of reduced involvement in the criminal justice system of \$107.1 million alone pays for the costs of expanding access to early care and education more than two and a half times over.

Regional Benefit Analysis

The Economics Center also evaluated the associated impacts of quality rated early care and education on seven state regions identified by Groundwork Ohio. These regions include Hamilton County, Franklin County, Montgomery County, Cuyahoga County, Lucas County, Summit County, and Appalachia (a 32-county region in Ohio). Key differences in labor force participation, unemployment, and retail trade activities were accounted for to ensure the most accurate representation of program benefits.

While the benefits differ between regions, there are also cost of living differentials across the seven regions. For example, the individual benefits accrued to Appalachia lag the rest of the regions, but the cost of housing or additional living factors may offset that in terms of costs. Additionally, programmatic decisions on policy implementation may be more advantageous in a region based on the density or composition of the industrial and occupational needs of companies and parents. Table 6 details the aggregate benefits for the seven regions analyzed.

⁷³ Cost estimate sourced from the Ohio Legislative Service Commission.

Table 6: Total Regional Benefits of Early Childhood Programs

Total Regional Benefits	
Total Participants	6,793
Marginal Differences in Academic Achievement	
Non-completion of High School	(761)
High School Graduation	459
College Graduation	302
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$14,295,961
Additional Income Taxes	\$344,756
Additional Sales Tax	\$123,557
Total Cost Savings	
Reduction in Public Health Burden	\$1,795,802
Reduction in Grade Retention Costs	\$8,488,440
Reduction in Special Education Costs	\$6,121,428
Reduction in Ohio Works First	\$2,567,790
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$73,998,007

Source: Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Hamilton County

Total Benefits for Hamilton County	
Total Participants	797
Marginal Differences in Academic Achievement	
Non-completion of High School	(89)
High School Graduates	54
College Graduates	35
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$1,853,204
Additional Income Taxes	\$46,623
Additional Sales Tax	\$14,987
Total Cost Savings	
Reduction in Public Health Burden	\$210,614
Reduction in Grade Retention Costs	\$995,538
Reduction in Special Education Costs	\$717,930
Reduction in Ohio Works First	\$301,154
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$8,678,600
Total Benefit per Early Childhood Participant	
Increased Income	\$2,326
Ohio Income Tax	\$59
Ohio Sales Tax	\$19
Ohio Works First	\$378
Crime Reduction	\$10,893
Public Health Savings	\$264
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$16,090

Note: Total may not sum due to rounding.

Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Franklin County

Total Benefits for Franklin County	
Total Participants	1,333
Marginal Differences in Academic Achievement	
Non-completion of High School	(149)
High School Graduates	90
College Graduates	59
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$3,069,009
Additional Income Taxes	\$76,793
Additional Sales Tax	\$27,575
Total Cost Savings	
Reduction in Public Health Burden	\$352,468
Reduction in Grade Retention Costs	\$1,666,056
Reduction in Special Education Costs	\$1,201,474
Reduction in Ohio Works First	\$503,989
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$14,523,844
Total Benefit per Early Childhood Participant	
Increased Income	\$2,302
Ohio Income Tax	\$58
Ohio Sales Tax	\$21
Ohio Works First	\$378
Crime Reduction	\$10,893
Public Health Savings	\$264
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$16,060

Note: Total may not sum due to rounding.

Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Montgomery County

Total Benefits for Montgomery County	
Total Participants	589
Marginal Differences in Academic Achievement	
Non-completion of High School	(66)
High School Graduates	40
College Graduates	26
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$1,330,551
Additional Income Taxes	\$31,470
Additional Sales Tax	\$12,281
Total Cost Savings	
Reduction in Public Health Burden	\$155,787
Reduction in Grade Retention Costs	\$736,377
Reduction in Special Education Costs	\$531,037
Reduction in Ohio Works First	\$222,757
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$6,419,364
Total Benefit per Early Childhood Participant	
Increased Income	\$2,258
Ohio Income Tax	\$53
Ohio Sales Tax	\$21
Ohio Works First	\$378
Crime Reduction	\$10,893
Public Health Savings	\$264
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$16,018

Note: Total may not sum due to rounding.

Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Cuyahoga County

Total Benefits for the Cuyahoga County	
Total Participants	1,240
Marginal Differences in Academic Achievement	
Non-completion of High School	(139)
High School Graduates	84
College Graduates	55
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$2,690,865
Additional Income Taxes	\$66,488
Additional Sales Tax	\$22,759
Total Cost Savings	
Reduction in Public Health Burden	\$327,735
Reduction in Grade Retention Costs	\$1,549,147
Reduction in Special Education Costs	\$1,117,164
Reduction in Ohio Works First	\$468,623
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$13,504,683
Total Benefit per Early Childhood Participant	
Increased Income	\$2,171
Ohio Income Tax	\$54
Ohio Sales Tax	\$18
Ohio Works First	\$378
Crime Reduction	\$10,893
Public Health Savings	\$264
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$15,929

Note: Total may not sum due to rounding.

Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Lucas County

Total Benefits for the Lucas County	
Total Participants	541
Marginal Differences in Academic Achievement	
Non-completion of High School	(61)
High School Graduates	37
College Graduates	24
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$1,213,155
Additional Income Taxes	\$29,287
Additional Sales Tax	\$10,704
Total Cost Savings	
Reduction in Public Health Burden	\$142,929
Reduction in Grade Retention Costs	\$675,601
Reduction in Special Education Costs	\$487,209
Reduction in Ohio Works First	\$204,372
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$5,889,555
Total Benefit per Early Childhood Participant	
Increased Income	\$2,244
Ohio Income Tax	\$54
Ohio Sales Tax	\$20
Ohio Works First	\$378
Crime Reduction	\$10,893
Public Health Savings	\$264
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$16,004

Note: Total may not sum due to rounding.

Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Summit County

Total Benefits for Summit County	
Total Participants	380
Marginal Differences in Academic Achievement	
Non-completion of High School	(43)
High School Graduates	26
College Graduates	17
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$886,464
Additional Income Taxes	\$22,099
Additional Sales Tax	\$7,791
Total Cost Savings	
Reduction in Public Health Burden	\$100,429
Reduction in Grade Retention Costs	\$474,711
Reduction in Special Education Costs	\$342,337
Reduction in Ohio Works First	\$143,602
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$4,138,294
Total Benefit per Early Childhood Participant	
Increased Income	\$2,333
Ohio Income Tax	\$58
Ohio Sales Tax	\$21
Ohio Works First	\$378
Crime Reduction	\$10,893
Public Health Savings	\$264
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$16,098

Note: Total may not sum due to rounding.

Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Appalachian Region of Ohio

Total Benefits for Appalachian Region	
Total Participants	1,913
Marginal Differences in Academic Achievement	
Non-completion of High School	(214)
High School Graduates	129
College Graduates	85
Total Impacts on Earnings and Fiscal Contributions	
Additional Earnings	\$ 3,252,713
Additional Income Taxes	\$71,996
Additional Sales Tax	\$27,460
Total Cost Savings	
Reduction in Public Health Burden	\$505,839
Reduction in Grade Retention Costs	\$2,391,012
Reduction in Special Education Costs	\$1,724,276
Reduction in Ohio Works First	\$723,292
Total Lifetime Criminal Justice Savings	
Reduction in Lifetime Criminal Justice Costs	\$20,843,668
Total Benefit per Early Childhood Participant	
Increased Income	\$1,700
Ohio Income Tax	\$38
Ohio Sales Tax	\$14
Ohio Works First	\$378
Crime Reduction	\$ 10,893
Public Health Savings	\$264
Special Education Savings	\$901
Grade Retention Avoidance	\$1,250
Total	\$15,438

Note: Total may not sum due to rounding.

Source: Economics Center's calculations using Census data, State of Ohio data, and outcomes detailed in the literature review.

Conclusion

The Economics Center reviewed multiple historical early childhood interventions as well as other academic literature pertaining to early care and education. The resources were then evaluated to estimate the significant impacts on long-term childhood development in terms of such factors as academic achievement, employment growth and increased labor force participation, impacts on societal factors such as criminal justice and public health, and impacts regarding the participants' pathway through the educational system in terms of grade retention and utilization of special and supplemental needs courses.

The Economics Center also prepared a proposed cohort system utilizing households that are currently earning between 131.0 percent and 150.0 percent of the federal poverty level. The number of children that were not participating in an early care and education program were determined to be the population that would benefit most from expanded access to a publicly funded program. Further, the Economics Center localized and quantified these impacts on the State of Ohio to determine overall benefits over an assumed 40-year period upon exiting from the education system as well as more detailed benefits per participant. The cost of expanding access to quality-rated early care and education programs from 130.0 percent to 150.0 percent of the federal poverty level in Ohio is estimated to be \$38.5 million annually, while the lifetime benefits of expanding access to 9,833 participants is approximately \$155.6 million. Comparing the benefits to the cost of expanding access to quality rated early care and education in Ohio results in a lifetime return on investment of 404.0 percent, or approximately 10.1 percent annually over the participants' lifetime.

Study findings were localized to seven regions within the State of Ohio to best estimate how socioeconomic and geographical differences can affect program outcomes. Ultimately, these findings were pared down to the seven regions based on the proportion of children in households between 131.0 percent and 150.0 percent of the federal poverty level and netting out children that were already enrolled in an early care and education program and/or did not reside within the study areas.

The analysis provides detailed information regarding program outcomes by region, which could be vital in further policy and early childcare program development to better account for the relative benefits of initiatives to the associated costs.

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Appendix

The Abecedarian Project

The Abecedarian Project was a randomized controlled trial program in which low-income children from the Chapel Hill area in North Carolina were assigned to either the treatment or control populations. Four cohorts of children were recruited to participate in the Abecedarian Project during the early-to-mid 1970s. During this time, 111 infants were enrolled, of which 57 were assigned to the treatment group, and 54 formed the control population. Nearly all (98.0 percent) of the participants were Black/African American, and more than three-quarters (76.0 percent) were from female-headed households.

Children assigned to the treatment population received a research-based educational childcare program in which they participated from birth until kindergarten. The center that housed the Abecedarian Project was open five days per week, 50 weeks each year, and provided treatment participants with a customized learning experience. Learning activities for infants rotated every couple of weeks, and preschool rooms were designed to promote pre-literacy and provided the treated children with extensive learning tools. The full-day program focused on active learning experiences, dramatic play, and pre-academics. As the treatment children reached the ages of three to five, the curriculum focused more on pre-academic skills and "socio-linguistic and communicative competence."⁷⁴

The Brookline Early Education Project

The Brookline Early Education Project was a community-based initiative that paired with an early education program with health services in Brookline and Boston, Massachusetts, in the mid-1970s. The program was available to all families and children from the ages of three months prior to birth until kindergarten enrollment. In total, 282 children were enrolled in the Brookline Early Education Project. Enrolling children from the cities of Brookline and Boston allowed for suburban and urban participation. Children were randomly assigned to one of three groups: A, B, or C. The A group received the highest intensity of services, while the C group received the least.⁷⁵ All children in each of the groups received regular health and developmental evaluations, weekly playgroups at age two, and daily preschool from three to five years of age.

⁷⁴ Garcia et al. (2016)

⁷⁵ Palfrey et al. (2005)

Parents of children in all three of the groups participated in conferences and information session.⁷⁶

Households with children in groups A and B received home visits and participated in parent groups. The A group had, on average, 14 to 18 home visits and eight parent group sessions during the children's first two years, while parents in group B had 10 to 12 home visits, on average, and five group sessions.⁷⁷ Parents in the C group neither received home visits nor participated in parent groups but were able to receive books and toys from the center.

Notably, while the Brookline Early Education Project is not as widely cited as the others, it has been used by the Economics Center as it included children from urban and suburban households.

The Chicago Child-Parent Centers Program

The Chicago Longitudinal Study, a quasi-experimental design, evaluated the outcomes of the Chicago Child-Parent Centers Preschool Program. The Chicago Child-Parents Programs, a multi-site, publicly funded intervention housed within or adjacent to public schools in low-income Chicago neighborhoods. The Chicago Longitudinal Study evaluated the efficacy of the Chicago-Parent Centers at multiple participation levels, including preschool, kindergarten, school-age participation, and extended participation. The preschool cohort consisted of 1,539 children, of which 989 received the intervention while the remaining 550 students formed the control group.

The Chicago Child-Parent Centers Program provided educational and family services to families with children between the ages of three to nine and emphasized basic language arts and math skills.⁷⁸ The program provided structured yet diverse experiences that included teacher-led, whole-class instruction, small group, field trips, and play.⁷⁹ The preschool program was provided for three hours per day, five days per week, over a nine-month duration each year. This publicly funded early care and education program requires its participating centers meet standards of quality, including that classrooms have a 2:17 staff-child ratio and that lead teachers possess a bachelor's degree and credential in early childhood education. Teachers are also compensated commensurate with educational attainment.

⁷⁶ Palfrey et al. (2005)

⁷⁷ Palfrey et al. (2005)

⁷⁸ Reynolds et al. (2002)

⁷⁹ Reynolds et al. (2002)

In addition to providing preschool services, the Chicago Child-Parent Centers Program also included a parent program that involved parent room activities, volunteer opportunities in the preschool rooms, participating in school events and field trips, and offered courses for completing high school.⁸⁰ Further, the Chicago Child-Parent Center Programs implemented outreach efforts that included home visits.⁸¹

Colorado Preschool Program

The Colorado Preschool Program (CPP) was established in 1988 with the goal of providing high-quality early care and education opportunities for at-risk children aged three to five. The program has since served more than 400,000 children who have attended high-quality early care and education programs, local childcare centers, community-based preschools, or Head Start programs. Three-year-old children are deemed eligible for CPP if they meet three out of ten identified risk factors, and four- and five-year-old children may be eligible if they meet one out of ten identified risk factors and are not age-eligible for kindergarten. The vast majority (71.1%) of children served by CPP are eligible for free or reduced-price lunch, which represents the largest risk factor contributing to CPP eligibility. Colorado Preschool Programs are assessed by a quality rating system called Colorado Shines, which rates programs on a scale from Level 1 to Level 5, with Level 5 representing programs of the highest quality. Distinguished by level, Level 1 programs support children's health and safety, Level 2-rated programs ensure early childhood professionals are well-trained, effective, and appropriately compensated, Level 3 programs provide a supportive, play-based learning environment and focus on social and emotional learning, Level 4 programs help parents become partners in their child's learning, and Level 5 programs demonstrate strong leadership and business practices. CPP programs have improved their quality ratings over time, and most children are now served in programs rated Level 4 or higher. CPP also requires that parents or guardians sign an agreement regarding their responsibilities to their child's education. Programs serving children with CPP must use various strategies to actively engage families in preschool, and 38.0 percent of all districts report using all engagement strategies identified by CPP. Colorado's funding for CPP has increased slowly over time, both at the overall and per-pupil level. For the 2018-2019 school year, the State served 29,360 preschool positions in 810 schools, averaging 34 children per licensed facility. For CPP programs serving preschool, 77.5 percent of children in CPP were served by a

⁸⁰ Reynolds et al. (2002)

⁸¹ Reynolds et al. (2002)

public school, 13.3 percent by a community provider, and 9.2 percent by the Head Start Program.

The Colorado Preschool Program has been found to yield significant outcomes for its participants both during the school year and long-term. Children participating in CPP for the 2018-2019 school year made significant gains in all six development areas between the fall and spring: social-emotional, physical, language, cognitive, literacy, and mathematics. In all areas except for math, more than 90 percent of these children met or exceeded age expectations by the end of the school year. Long-term outcomes were determined by comparing CPP participants to grade-matched comparison groups who were also defined as at-risk but had no history of publicly funded childcare.⁸²

The High/Scope Perry Preschool Program

The High/Scope Perry Preschool Study was a randomized controlled treatment program of the High/Scope Perry Preschool Program in Ypsilanti, Michigan. Three- and four-year-old children from low-income households in the Perry School District were divided into a treatment group that received a high-quality preschool program and a control group that did not receive preschool. In total, 123 children were enrolled, all of whom were Black/African American. The treatment group totaled 58 children, and the control group was comprised of 65 children.

The preschool program was offered from October to May each year and consisted of daily classes that lasted two and a half hours on weekday mornings. Each year, 20 to 25 children received the preschool intervention. The Perry Preschool Program used the child developmental theory as its framework, and the teachers and parents encouraged children to participate in activities that enabled them to learn through decision making and problem solving. Additionally, the preschool teachers make weekly home visits to the mother and child.

⁸² Colorado Department of Education (2020)