

The Economic Returns from Investing in Early Childhood Programs in the Granite State

With the growing understanding of the importance of the first five years for child health and development and the consequences for children who face various early-life stressors, states have been expanding their investments in early childhood programs, particularly those targeted toward at-risk children. Such investments have been demonstrated to benefit children and their families in the short run (as children are better prepared to enter school) and in the longer term (as children perform better academically, increase their educational attainment, experience better labor market outcomes, and require fewer social services). Policymakers and the public view such programs as an important economic development strategy that boosts the human capital, and therefore the productivity, of the future workforce.

In support of decisionmakers in New Hampshire considering options for expanding investments in early childhood, especially for the state's most vulnerable children, researchers from the RAND Corporation conducted an assessment of the landscape of current investments in early childhood programs in the state; summarized the research evidence on the benefits and economic returns of three strategies for early intervention—home visiting in the first few years of life, high-quality child care for young children, and high-quality preschool; and estimated the costs and benefits of statewide investments in proven early childhood programs targeted to at-risk children.

Current Early Childhood Landscape

On average, young children in New Hampshire (those who are ages 0 to 5 and have not yet entered kindergarten) fare relatively well compared with their counterparts in other states. However, indicators of child well-being on average conceal significant pockets of poverty and disadvantage for the state's young children. The official poverty rate for children younger than age 6 as of 2015 stood at 12 percent, but the poverty rate has been on an upward trajectory for the past 15 years. Furthermore, with the federal poverty level (FPL) set nationwide at the same level (e.g., \$19,096 for a family with one adult and two children as of 2015), the official poverty statistics do not account for the high cost of living in the state. As of 2015, 30 percent of young children in New Hampshire were in low-income families—those with income below two times the poverty level (e.g., about \$38,200 for the above referenced family of three). To reach self-sufficiency in New Hampshire, families need an income of about three times FPL; 45 percent of the state's young children live in families with income that is below that threshold. Starting at birth, as many as one in three children in New Hampshire could be considered at risk of compromised development because of low birth weight, low family resources, or other stressors that can interfere with healthy physical, social, emotional, and cognitive development.

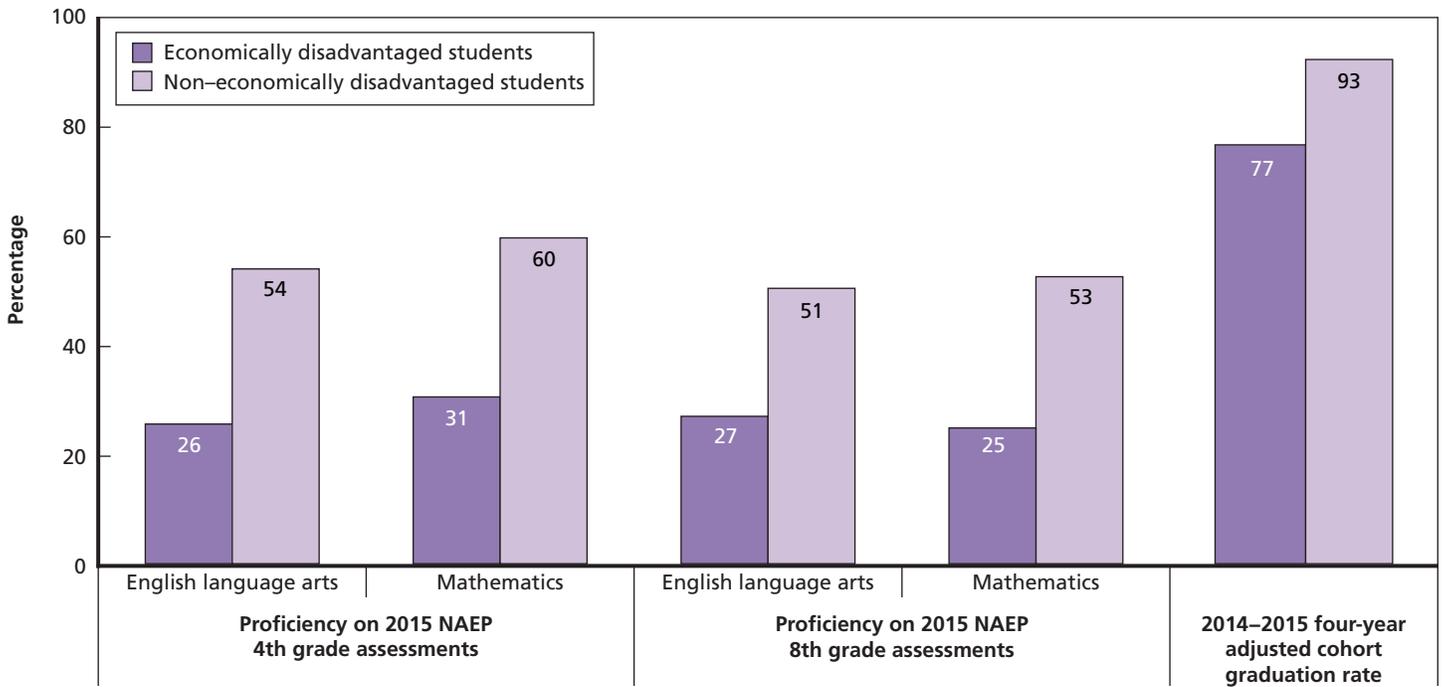
These early-life and ongoing disadvantages in childhood have consequences for children in terms of lower levels of readiness for

Key findings:

- A sizeable share of young children in New Hampshire (ages 0 to 5) face risks in early childhood that may compromise healthy development, with consequences for their success in school and beyond.
- Current public investments in low-income or otherwise disadvantaged young children and their families are primarily supported with federal monies but are not funded to reach all those who are eligible.
- Rigorous evidence documents the short- and longer-term benefits from early childhood programs, including well-designed home visiting programs from before birth through the first few years of life and high-quality preschool programs.
- Implementation of a proven nurse home visiting program in New Hampshire for low-income first-time mothers is estimated to return \$4 to \$6 for every dollar invested.
- A state-funded one-year voluntary preschool program for children in families with income up to three times the federal poverty level would produce a return of \$2 for every dollar invested and nearly \$4 for every dollar of cost if the program targets children living in families in poverty.

school, diminished educational outcomes once they enter school, and less-successful outcomes in the labor market, family life, and civic life upon reaching adulthood. For example, results from the 2015 National Assessment for Educational Progress (NAEP) show a substantial gap between economically disadvantaged students (those with family income below 185 percent of FPL) and their non-economically disadvantaged counterparts in the percentage of students who demonstrate proficiency in English language arts and mathematics as of fourth and eighth grades (see Figure 1). This gap in student achievement in core subjects is later manifested in a gap in the high school graduation rate: Just 77 percent of economically disadvantaged students in New Hampshire in 2014–2015 graduated high school in four years, compared with 93 percent of their more economically advantaged peers. These and other adverse outcomes ultimately have economic consequences for the individual, such as lower lifetime earn-

Figure 1. Student Performance Measures for New Hampshire by Family Economic Status



SOURCES: National Center for Education Statistics and New Hampshire Department of Education.
 NOTES: Economically disadvantaged students live in families with income below 185 percent of FPL.
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ings, but society will bear the costs as well, through a lower tax base and higher costs for social welfare programs and crime.

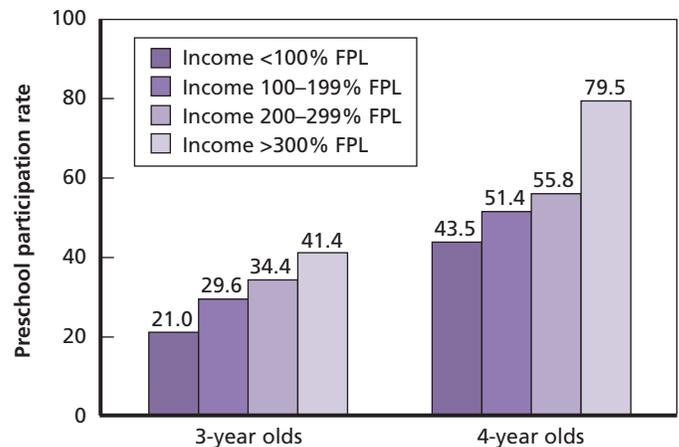
Current public investments in New Hampshire in the early years, largely supported with federal funds, address the need to support low-income families with young children with services designed to reduce early-life stressors, foster strong parenting, promote school readiness, and provide subsidized child care for working parents. These programs include Home Visiting New Hampshire (HVNH), with funding through the federal Maternal, Infant, and Early Childhood Home Visiting (MIECHV) program to provide home visiting services starting in the prenatal period to age 3 using the Healthy Families America (HFA) model; Early Head Start and Head Start, which together offer home- and center-based services starting prenatally and continuing to kindergarten entry for children and families with income below FPL; Title I funds available to high-poverty schools; and Child Care Scholarships, voucher-based child care subsidies for young children and school-age children in working families with incomes up to 250 percent of FPL.

Most important, these programs are not funded to reach all children and families who are income-eligible, much less children and families with somewhat higher incomes who could still benefit. For example, HVNH HFA and Early Head Start reach just 5 percent and 7 percent, respectively, of infants and toddlers in families with income below FPL. Even with higher funding levels, Head Start can serve just 40 percent of the eligible population of 3- and 4-year-olds in families with incomes below FPL. Funding levels for Child Care Scholarships mean that, at best, 13 percent of eligible infants and toddlers and 22 percent of eligible preschool-age children receive subsidies.

Because of these funding limits, family income remains a strong determinant of which children participate in programs designed to promote school readiness and other developmental goals. For

example, data from the American Community Survey (ACS) show that participation in preschool or nursery school programs on the part of 3- and 4-year-olds, according to parent reports, marches steadily upward as family income rises, with preschool participation rates that nearly double in moving from children in families with income below FPL to children in families where income exceeds three times FPL (see Figure 2).

Figure 2. Estimated Preschool Participation Rate in New Hampshire by Family Income Relative to the FPL



SOURCES: Author's analysis of the 2011–2015 ACS PUMS.
 NOTES: The preschool participation rate is measured as the percentage of children in the age group enrolled in nursery school or preschool in the past three months.

Evidence of Effective Early Childhood Interventions

Given the limited reach of federally funded programs and the growing evidence base of proven early childhood programs, many states (and localities) have been investing their own funds to expand access to early childhood programs. Two early childhood program approaches have a particularly strong body of evidence of effectiveness from rigorous evaluations.

Home visiting from the prenatal period to the first few years of a child's life has been considered an evidence-based early intervention for more than three decades. Indeed, the federal MIECHV program has identified 17 home visiting models with evidence of effectiveness—based on randomized control trials or other rigorous evaluation methods that can be used to measure causal effects—in at least one or two of the eight outcome domains prioritized for the program. This includes the HFA program implemented by HVNH, which has evidence of favorable effects on child development and school readiness, positive parenting practices, reductions in child maltreatment, and referral to services. The Nurse-Family Partnership (NFP) program is another home visiting program with a strong evidence base, with favorable effects in the same domains as HFA (with the exception of linkages to services), as well as child health, maternal health, and family self-sufficiency.

Research on the effectiveness of preschool programs that are offered one or two years before kindergarten entry spans more than 50 years. More recently, as states and school districts have implemented targeted or universal preschool programs, evidence has been accumulating that indicates high-quality preschool programs can be effective when scaled up to a district or state level. Thus, benefits long associated with small-scale demonstration programs, such as the Perry Preschool program, have now been documented for scaled-up programs. These include improved school readiness, gains in student achievement, reduced rates of special education use and grade retention, and higher rates of high-school graduation. One scaled-up program with long-term follow-up, the Chicago Child-Parent Centers program, also shows reduced levels of substance use and criminal activity.

Favorable short- and longer-term effects have been demonstrated for part- and full-day preschool programs, as well as one- and two-year programs. Effective programs include both those that are delivered through public schools and those that use a mixed delivery system, with both public school providers and community-based providers (such as Head Start programs and nonprofit or for-profit private center-based programs). Further, while most of the scaled-up programs evaluated to date are targeted toward low-income children, universal programs, such as the state-funded program in Oklahoma and district-funded program in Boston, demonstrate that children across the income spectrum can benefit, although the effects tend to be larger for more-disadvantaged children.

Estimated Economic Returns from Evidence-Based Programs

Early childhood programs that are amenable to an economic analysis include those with information on program cost, evidence from rigorous evaluations demonstrating the causal effect of the program on one or more outcomes, and outcomes that can be expressed in terms of dollar benefits. Given the available evidence, the RAND study conducted an economic analysis of the costs and benefits of two targeted early child programs: a home visiting program modeled

on NFP and a one-year high-quality preschool program modeled on scaled-up state and district programs. (The HFA program implemented by HVNH also has evidence of effectiveness from evaluations in other states, but those effects cannot be extrapolated to HVNH given differences across HFA programs in the populations served and program services.)

The benefit-cost methodology compares the per child cost for the modeled program with the economic value of the program outcomes, where both costs and benefits in future years are discounted to the present (called present-value dollars) using a 3-percent discount rate, to account for the future value of money. The analysis takes the societal perspective, meaning that it accounts for the costs and benefits that accrue to the program participants themselves, to the public sector (that is, taxpayers), and to the rest of society at large. The analysis accounts for the current level of services (the status quo) and models the incremental costs and benefits, specific to New Hampshire, associated with the increased number of participants in the early childhood program. The estimates do not account for one-time transition costs that may be required to implement new programs or for system-level costs, such as for overall program administration or ongoing monitoring and evaluation. Given that conservative assumptions are used about the potential benefits, this omission is not expected to substantially affect the estimated returns once a program is fully implemented.

Costs and Benefits of a Home Visiting Program

For the home visiting model, the estimates assume that the NFP program is implemented with fidelity, including the employment of qualified nurses. The voluntary program would serve first-time mothers with incomes below 100 percent of FPL who are less than 28 weeks pregnant at the time of their first visit and continue in the program until the child reaches their second birthday. The model assumes that 100 mother-child pairs in each annual birth cohort would be served, which equates to a 17-percent participation rate among the target population, but a higher participation rate could be accommodated if the qualified workforce is available. The model assumes that the current level of HFA services can continue alongside the NFP model since they target somewhat different populations.

Under a range of assumptions about the effectiveness of NFP in New Hampshire relative to the demonstrated benefits in other communities where the program has been rigorously evaluated, the estimates show that NFP would produce benefits per child that exceed the cost of the program, with ratios of about \$4 for every dollar invested (using more-conservative assumptions) to \$6 for every dollar invested (using less-conservative assumptions). The major sources of benefits include increased maternal earnings and the savings associated with reductions in crime for both the mother and the child. Assuming that 100 mother-child pairs are served per annual birth cohort, the present-value investment would be about \$800,000, compared with present-value benefits ranging from \$3.2 million to \$4.7 million.

Costs and Benefits of a High-Quality Preschool Program

In the case of a preschool program, the estimates assume a statewide, targeted, voluntary preschool program for 4-year-olds (one year before kindergarten entry). The program may be offered in public schools or by community-based providers following the same standards for quality. The lead teacher in the classroom is assumed to have a bachelor's degree and be paid a salary consistent with the salary for

a public school kindergarten teacher; the assistant teacher is assumed to have an associate's degree. The program would follow other high-quality practices consistent with those in proven scaled-up state and district programs. The program is assumed to offer preschool services for six hours per day (30 hours per week) and follow an academic-year calendar. (Families who qualify for Child Care Scholarships could be subsidized for an extended day or summer months.) The estimates assume that the program would be available, without cost, to children in families with annual income up to 300 percent of FPL and that 80 percent of children in the eligible income group would enroll in the voluntary program (a participation rate consistent with those of other publicly funded voluntary preschool programs). Other assumptions allow for attenuation in impacts for children with family income between 200 and 300 percent of FPL relative to those with lower incomes and for reduced effects for children who would have participated in an early learning program under the status quo. Head Start participation is assumed to continue, at current levels, in addition to the state-funded program.

With these assumptions, the estimates in the preferred baseline model show an overall positive rate of return for a program that serves children in families with incomes up to 300 percent of FPL. With a per-child program cost of \$9,309, the model estimates total benefits of \$20,866, primarily in the form of future earnings benefits for the participating child as a result of improved educational performance and attainment. Other benefits are associated with lower education system costs. Net present-value benefits (benefits minus costs) equal nearly \$11,600 per child, for a benefit-cost ratio of 2.24. Under more-conservative assumptions of impact, the benefit-cost ratio is 1.68, while under less-conservative assumptions it is 2.80.

Estimates of the returns are highest for children in the lowest income tier, those with family income below FPL. The benefit-cost ratio for this most economically disadvantaged group ranges from 2.36 to 3.93 under the range of assumptions. However, the social benefits exceed the program costs for children in all income groups below 300 percent of FPL under all assumptions.

These estimates are likely to be lower bounds on the potential economic returns from a targeted high-quality preschool program. Because there are fewer studies with evidence of longer-term effects of scaled-up preschool programs in regard to crime, such potential benefits have not been included. Other estimates suggest that the social benefits related to crime prevention could be as high as \$4,000 per child for the lowest income group, which would increase the benefit-cost ratio for that group to 3.57 under the baseline assumptions. There is also suggestive evidence that parents may respond by increasing their employment and earnings when a publicly funded, high-quality preschool program is made available. This would generate additional benefits for families (and the government) through higher income, and employers may benefit as well from a more productive workforce.

Implications for State Policy

Our analyses demonstrate that New Hampshire can expect positive net social benefits from expanding early childhood programs targeted toward children in lower-income families, particularly in two types of voluntary programs where the evaluation evidence supports an economic analysis—namely, home visiting following the NFP model and a high-quality publicly funded preschool program. As policymakers in the public and private sectors in New Hampshire consider new investments in early childhood programs, research on child development, lessons from program evaluation, and experience with implementation in other communities supports the following general guidance.

Consider an investment portfolio with a continuum of coordinated programs. Because children may be at risk of compromised development throughout the early years, it is important to invest in a portfolio of evidence-based programs starting prenatally and continuing until kindergarten entry. Based on the underlying need and evidence of economic returns, new investments could include adding the NFP home visiting model for first-time low-income mothers to the existing home visiting services available in the state and providing a state-funded preschool program that would be available at least to children in families with income below poverty levels.

Invest in program quality, maximize participation, and optimize the transition to the early elementary grades. The estimated economic returns are predicated on implementing high-quality programs to ensure that the effects measured in evaluations of programs in other communities are realized. Another consideration for maximizing impact is ensuring that participating children and adults engage in a given early childhood program as fully as possible. To further capitalize on early childhood investments, it is important to have alignment between the early childhood system and the K–12 systems, especially in the early elementary grades.

Include resources to monitor the quality of program implementation, evaluate new program models, and engage in continuous quality improvement. Ensuring that early childhood programs are as effective as possible means engaging in an ongoing process of monitoring the quality of the program services delivered, assessing participant outcomes, and periodically evaluating program effects relative to a valid comparison group.

Invest in integrated data systems to ensure that families and children can benefit from the continuum of offerings and to support monitoring and evaluation. Such data systems can be used to monitor participation rates, identify populations that are not accessing program services, ensure a hand-off from participation in one program to another as children mature, and support the process of continuous quality improvement.

This brief describes work done in RAND Education and RAND Labor and Population documented in *Investing in the Early Years: The Costs and Benefits of Investing in Early Childhood in New Hampshire*, by Lynn A. Karoly, RR-1890-EH, 2017 (available at <http://www.rand.org/t/RR1890>). To view this brief online, visit www.rand.org/t/RB9952. The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.

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