

# RESEARCH BRIEF #1: STATE PRE-KINDERGARTEN

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## WHAT ARE STATE PRE-KINDERGARTEN (PRE-K) PROGRAMS?

State pre-kindergarten programs (also called state pre-K) provide state-funded, classroom-based educational services to young children, typically four-year-old children, although some states also enroll three-year-old children. About two-thirds of children are served in public schools, but most states also fund pre-kindergarten programs in community-based settings such as private preschools, local child care agencies, and Head Start centers. Some programs are for low-income children or others at risk of entering school unprepared while some are universally open to all children. Programs are typically half-day programs provided during the academic year, with some extending to full-day services and/or year-round education. Teacher requirements vary across the states.<sup>1</sup>

States are in different phases of implementation, with only a few states providing services statewide. In 2006–2007, 38 states had some form of state pre-kindergarten or preschool program, serving just over one million children in 2006–2007. State spending averaged about \$3,600 per child in 2006–2007; total spending, including spending from federal and local sources, was estimated to be at least \$4,100 per child.<sup>2</sup>

## WHAT ARE THE IMPACTS OF STATE PRE-K ON CHILDREN AND FAMILIES?

A growing body of research provides good evidence that state pre-K programs have positive impacts on children's cognitive skills, including both pre-reading and pre-math skills. While some studies find quite large program impacts, others find smaller impacts. This variation in findings may reflect differences in evaluation design as well as variation in the types and quality of state pre-kindergarten programs. Some studies have found small negative impacts on children's classroom behavior.

**Cognitive and School-Related Outcomes:** Three recent well-designed studies conclude that children attending state pre-K programs gain in cognitive skills:

- Universal pre-kindergarten in Oklahoma has large impacts on children's ability to identify letters and pronounce words (a 53 percent gain in letter-word identification test scores), as well as

medium-sized impacts on both math and spelling skills (an 18 percent gain in applied problems test scores and a 26 percent gain in spelling scores), according to a well-regarded study of pre-K in Tulsa.<sup>3</sup>

- Similar patterns were found in a five-state study of state pre-K programs in Michigan, New Jersey, Oklahoma, South Carolina, and West Virginia. Fairly large effects were reported for children's awareness of the letters of the alphabet (print awareness), accompanied by smaller but still substantial effects on math skills and vocabulary development.<sup>4</sup>
- A study analyzing nationally representative data from the Early Childhood Longitudinal Survey of children entering kindergarten (ECLS-K) found somewhat smaller gains from pre-kindergarten attendance than those found in Oklahoma and the five-state study. The gains were statistically significant, however, and enough to move the

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average child from the 50th to the 55th percentile in pre-reading skills and from the 50th to the 54th percentile in pre-math skills.<sup>5</sup> As discussed further below, the gains in the ECLS-K study were higher for disadvantaged children.

A review of 13 evaluations from the 1980s and 1990s of state-funded preschool also reported gains in cognitive skills (though the review noted that the earlier evaluations suffered from many methodological weaknesses). In addition, the review found consistent evidence of reduced grade retention among children attending state pre-kindergarten programs. For example, 26 percent of children attending preschool in Maryland were held back one or more years by third grade, compared to 45 percent of children in the comparison group.<sup>6</sup>

#### Behavioral and Socio-emotional Outcomes:

Kindergarten teachers reported higher rates of classroom behavior problems among former participants in state pre-K when compared to children who were solely cared for by parents, even after controlling for many differences between the two groups of families in the ECLS-K sample. While the change was small and observed among a population with fairly low levels of aggressive behavior overall, the impacts persisted through spring of first grade. Interestingly, behavior problems did not increase noticeably for children whose pre-K and kindergarten classrooms were located in the same public school.<sup>7</sup>

Other studies of preschool programs and child care report both positive and negative effects on children's emotional development and social skills, with a number of studies finding small increases in aggression, in line with those reported above, and other studies emphasizing improvements in self-esteem and motivation, and reductions in later criminal behavior and teen births.<sup>8</sup>

**Health and Safety Outcomes:** Evaluations of state pre-kindergarten provide no evidence on health and safety outcomes, which are not a focus of state pre-K programs.<sup>9</sup>

**Outcomes for Parents:** State pre-kindergarten programs generally do not include services to parents among their goals, and there is no evidence on outcomes for parents.<sup>10</sup>

**Medium- and Long-term Outcomes:** As much as 70 to 80 percent of the observed gains in cognitive skills associated with pre-kindergarten attendance fade out over time, according to analysis of ECLS-K data on children in the spring of first grade, as other children “catch up” in educational skills. An important exception is that the increased skills associated with public preschool attendance persist for children of low-income or low-skilled parents in this nationally representative sample.

There are no data on the medium- or long-term outcomes in Oklahoma or other states in the five-state study of state pre-K. However, earlier studies of state preschool programs have found that many of the cognitive gains fade out by the end of first grade, a problem observed in studies of other early childhood interventions.

While Perry Preschool and other model preschools showed some very positive long-term outcomes despite fadeout in cognitive gains (e.g., higher educational achievement and higher lifetime earnings as an adult despite fadeout in IQ gains), there are no long-term studies of public pre-K outcomes.

**Benefit-Cost Estimates:** The RAND Corporation has estimated a positive return of \$2.62 in societal benefits in return for every \$1 spent on preschool services if a universal pre-K program were adopted in California. While this estimate is extrapolated from findings from the Chicago Child-Parent Centers, not a traditional state pre-K program, it provides a reasonable estimate of the economic benefits of state investments in pre-K programs.<sup>11</sup>

## HOW DO THE IMPACTS OF STATE PRE-K VARY?

**Family Income.** Research suggests that children of all income levels gain from pre-K but the impacts are largest among disadvantaged children. For example, the gain in math and reading skills was larger among disadvantaged children than in the overall national sample in ECLS-K, and impacts persisted through the spring of first grade, in contrast to the fadeout observed for the overall population.<sup>12</sup>

**Race and Ethnicity.** The study of universal pre-K in Oklahoma found that effects were particularly large for Hispanic children across all three cognitive domains tested – pre-reading skills, pre-math skills, and pre-writing skills.<sup>13</sup>

## HOW STRONG IS THE EVIDENCE BASE FOR STATE PRE-K?

The three studies central to this review are technically superior to the earlier state pre-K evaluations, while still falling short of the gold standard of random-assignment evaluation.<sup>14</sup> All three evaluations use rigorous study designs to isolate the effects of pre-K from the many other differences between children enrolled in pre-K and children not enrolled in such programs, including differences in the family’s motivation levels, as well as more readily observed differences in family income, parental education, maternal employment status, etc. The studies of pre-K in Oklahoma and across the five-state evaluation used a technique called “regression discontinuity design” to control for self-selection,<sup>15</sup> while the national study of ECLS-K data exploits the rich information on child and family characteristics to try to control for demographic differences between children who participate in preschool programs and those who do not participate.

It is possible that outcomes in the typical state may be lower than outcomes in Oklahoma and other states in the five-state study since these states were not randomly selected and have programs that are more mature and higher than average in quality.<sup>16</sup> In fact, impacts are considerably smaller in the national ECLS-K data, although the differences could be due to study design as much as inclusion of states with weaker programs. The national study relied on parental reports of pre-kindergarten attendance (which is easily confused with Head Start, private preschool, and other center-based programs) and its results may suffer from selection bias despite the researchers’ efforts.

## IS STATE PRE-K GENERALLY VIEWED AS EFFECTIVE?

Most observers agree that pre-K programs are effective at their stated goal of improving children’s

readiness to learn. Some studies suggest that public pre-K programs have quite large impacts on cognitive skills, as large as those found in more expensive, model childhood interventions, such as the Perry Preschool program. Other studies suggest the impacts are more modest – though still significant, both statistically and when compared to other educational policy interventions. A number of studies find evidence that the positive impacts may diminish over time, though not for all subgroups. Some research suggests that positive impacts on cognitive development may be larger or more long-lasting for low-income or at-risk children. Finally, there is some evidence that increases in cognitive skills are accompanied by small increases in classroom behavior problems, prompting some observers to call for increased attention to the socio-emotional dimensions of preschool learning.

## WHAT FEDERAL LEGISLATIVE ACTION LIES AHEAD FOR STATE PRE-K?

Three major legislative proposals providing grants to states to support, establish, or expand public pre-kindergarten program were introduced in 2007:

- S. 1374/H.R. 2859, the Prepare All Kids Act of 2007, introduced by Senator Casey (D-PA) and Representative Maloney (D-NY).
- S. 1823, The Ready to Learn Act, introduced by Senators Clinton (D-NY) and Bond (R-MO); and
- H.R. 3829, the Providing Resources Early for Kids or Pre-K Act, introduced by Representative Hirono (D-HI).

The House bills have been referred to the House Committee on Education and Labor, which approved H.R. 3829, the Providing Resources Early for Kids Act in late June 2008. The Senate bills have been referred to the Senate Committee on Health, Education, Labor, and Pensions. Since the fall of 2007, there has been discussion of incorporating pre-K legislation into the reauthorization of the No Child Left Behind Act and the Elementary and Secondary Education Act. Alternatively, pre-K legislation could move forward independently of action on elementary and secondary education.

## NOTES:

<sup>1</sup> Pre-K Now, *Pre-K Across the Country*, <http://preknow.org/policy/factsheets/snapshot.cfm>.

<sup>2</sup> W. Steve Barnett, Jason Hustedt and others, *The State of Preschool 2007* (New Brunswick, N.J.: National Institute for Early Education Research (NIEER), 2007), <http://nieer.org/yearbook/>.

<sup>3</sup> In Oklahoma, effect sizes were large for letter-word identification (0.79) and medium for spelling (0.64) and applied problems or pre-math (0.38). (Note that this review follows common convention in considering an effect size of 0.80 as “large,” 0.50 as “medium” and 0.20 as “small.”) William T. Gormley Jr., Ted Gayer, Deborah Phillips, and Brittany Dawson, “The Effects of Universal Pre-K on Cognitive Development,” *Developmental Psychology* 41 (2005): 872-884.

<sup>4</sup> The state pre-kindergarten programs increased print awareness by an effect size of 0.70 (averaged across the five states). Effect sizes for math and vocabulary were 0.29 and 0.14 respectively. Vivian Wong, Thomas Cook, W. Steven Barnett, and Kwanghee Jung, “An Effectiveness-Based Evaluation of Five State Pre-Kindergarten Programs,” *Journal of Policy Analysis and Management* 27 (2008): 122-154. NIEER researchers have also used similar research techniques (the regression discontinuity research design described in footnote 15) and found positive impacts in two additional states (Arkansas and New Mexico). A comprehensive but less methodologically rigorous evaluation in Georgia also shows increases in cognitive skills for children enrolled in public pre-K programs. See Gary T. Henry and Dana Rickman with four other authors, *The Georgia Early Childhood Study, 2001-2004 Final Report* (Atlanta, GA: Georgia State University, 2005), <http://aysps.gsu.edu/publications/2005/EarlyChildhoodReport.pdf>.

<sup>5</sup> Effect sizes were small: 0.12 in reading and 0.10 in math. The comparison is between children in prekindergarten (not including Head Start, private preschool or center-based child care) to children who are only in parental care. See Katherine Magnuson, Christopher Ruhm, and Jane Waldfogel, “Does Prekindergarten Improve School Preparation and Performance?” *Economics of Education Review* 26 (2007): 33-51.

<sup>6</sup> The recent study of ECLK-K by Magnuson et al., 2007 also found that children attending pre-K were less likely to be held back in kindergarten, although being held back was an infrequent event (affecting only 3% of children) and the observed change was not statistically significant, except among children whose mothers were welfare recipients. For the earlier review, see Walter Gilliam and Edward Zigler, “A Critical Meta-Analysis of All Evaluation of State-Funded Preschool from 1977 to 1998: Implications for Policy, Service Delivery and Program Evaluation,” *Early Childhood Research Quarterly* 15 (2001): 441-473.

<sup>7</sup> The effect sizes on classroom behavior were small, an 0.11 increase in externalizing behavior and an -0.07 decrease in self control. This is equivalent to raising children from the 50th to the 54th percentile in externalizing (aggressive) behavior and from the 50th to the 47th percentile in self-control. Magnuson et al., 2007.

<sup>8</sup> Studies of child care settings more generally also indicate that time spent in non-maternal care between birth and age five is associated with small increases in aggression and non-compliance, and that this effect may persist longer for children who attend center-based settings for more than two years. Evaluations of model preschool programs for low-income children provide mixed evidence of effects on behavior problems; the Abecedarian program, which involved center-based care from infancy onward, found some increase in elementary school classroom behavior problems among early cohorts of participants, while the Perry Preschool and Chicago Parent-Child Centers found less behavioral problems as measured by rates of juvenile and adult criminal activity. Lisa A. McCabe and Ellen C. Frede, “Challenging Behaviors and the Role of Preschool Education,” NIEER Preschool Policy Brief 16 (2007), <http://nieer.org/resources/policybriefs/16.pdf>.

<sup>9</sup> Only one of the thirteen evaluations reviewed by Gilliam and Zigler, 2001 included health outcomes; it found no significant difference between pre-kindergarten and a comparison group of similar children.

<sup>10</sup> Three of the thirteen evaluations reviewed by Gilliam and Zigler, 2001 collected data on parental involvement in elementary school; two found small positive impacts (effect size of 0.15) but only one of them was statistically significant.

<sup>11</sup> This benefit-cost estimate is based on an extrapolation of results from the Chicago Child-Parent Centers, a preschool intervention which, while located in the Chicago Public Schools, differs in some ways from state pre-kindergarten programs. For example, the Chicago Child-Parent Centers serve an economically disadvantaged population, have a fairly low student to staff ratio, higher spending per child than most state pre-K programs, and include an active parent involvement component.



The RAND estimate for universal pre-K in California included an explicit downward adjustment in benefits to reflect the likelihood that the benefits of preschool interventions will be lower for a universal population than for a population at risk for economic failure. Lynn Karoly and James H. Bigelow, *The Economics of Investing in Universal Preschool Education in California*, (Santa Monica, CA: Rand Corporation, 2005).

<sup>12</sup> The effect sizes on pre-reading and pre-math scores were 0.24 and 0.20, respectively, for disadvantaged children, compared to 0.12 and 0.10 for all children. The predicted increase in reading was from the 39th to the 44th percentile in reading for children whose parents had low income (less than poverty) or low skills (less than a high school diploma). Note that even after the pre-K gain, the average disadvantaged child would still score below the 50th percentile. (Magnuson et al., 2007).

<sup>13</sup> Gormley et al., 2005 report effect sizes for Hispanic children of 1.50 for letter-word identification, 0.98 for spelling, and 0.99 for applied problems. These effect sizes are large and higher than those reported for all children (see footnote 3).

<sup>14</sup> Under random-assignment evaluations, children would be randomly assigned to the program intervention (pre-K) or a control group of non-participants. This method would make it highly likely that observed differences are caused by the intervention rather than merely reflecting pre-existing differences in participating and non-participating children (such as the motivation of their parents to send them to educational programs).

<sup>15</sup> Under the regression discontinuity design (RDD), pre-K alumni entering kindergarten are compared with pre-K entrants, controlling for age and demographic differences and exploiting the fact that with strict birthday cut-off rules for pre-K entry, the pre-kindergarten treatment is the key difference between children a few weeks shy of the birthday cutoff and children a few weeks past the cut-off.

<sup>16</sup> Although the five states may not be nationally representative, classrooms within each state, and children within each classroom, were drawn randomly, and so the outcomes can likely be generalized for the five states.

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- Economic mobility and opportunity in the United States and investments in children, such as preschool programs, that could improve their chances to get ahead;
- The key role of education at all levels in creating the skills needed to promote opportunity and reduce poverty;
- The growth of single-parent families caused by early unwed childbearing and the decline of marriage; and
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