pre[k]now

Meaningful Investments in Pre-K: Estimating the Per-Child Costs of Quality Programs

Pre-K Now
Research Series
May 2008

Barbara Gault,
Anne W. Mitchell, and
Erica Williams, with
Judy Dey and Olga Sorokina

The Institute for
Women's Policy Research

Understanding the Cost of Quality

Pre-kindergarten programs are expanding in states around the nation. Decades of research on the impact of these programs show that high quality standards produce substantial benefits for children, working families, and communities.[1] Strong positive outcomes are associated with a number of factors; key among them are small class size and highly qualified teachers. Other program-design choices such as hours per day affect the extent to which programs meet families' needs and complement existing early care and education programs.

As state leaders seek to increase investments in pre-k, they face a number of choices and potential tradeoffs that all have clear spending implications. Policymakers require solid cost information to ensure that funding is adequate to provide high-quality educational opportunities, to allow both public and private centers to cover their costs and stay in business, and to encourage more centers to participate in publicly funded pre-k programs.

This brief provides national estimates of the per-child costs – in adjusted 2007 dollars – of pre-k in diverse settings and at varying levels of teacher quality, class size, and hours per day. The estimates give a general picture of the expected costs of quality improvements, though actual costs will differ from state to state.

Methods for Estimating the Cost of Pre-K at Varying Quality Levels

The Institute for Women's Policy Research (IWPR) and Early Childhood Policy Research (ECPR)[2] adapted their own cost estimation model to determine a per-child estimate for pre-k programs across 12 distinct levels of quality.

Assumptions about Program Characteristics

In carrying out its estimates of costs, IWPR assumes that all high-quality pre-k programs should possess the following characteristics, which provide benefits to children and families:

- At least one lead teacher and one assistant teacher with early childhood credentials in each classroom;
- High-quality educational and developmental materials are available to all children;
- Staff is available to promote parental involvement, provide parenting support, and facilitate access to community resources;
- Schools and centers perform internal evaluations and participate in third-party evaluations to assess child outcomes and school readiness.
- Schools and centers are regulated and properly monitored; and
- All facilities are adequately maintained to ensure the health and safety of children and staff.

Results: Estimated Hourly and Annual Per-Child Costs of Pre-K

Quality-Related Parameters for Cost Estimates

For the range of cost estimates the researchers consider varying degrees of quality for two key program elements: teacher qualifications/pay and class size.[3] Per-child cost estimates are conducted for three possible class sizes and four levels of teacher qualifications/pay in programs of three, six, and nine hours per day. The three class sizes are 20 (the minimum accepted standard for pre-k), 17, and 15 children per classroom. The four teacher-qualification/pay levels are, in order from highest quality to lowest:

- BA-I: A bachelor's degree-holding teacher with a credential in early childhood or a related field, paid at typical kindergarten-level wages[4]
- BA-II: A bachelor's degree-holding teacher with a credential in early childhood or a related field, paid at typical pre-k-level wages
- AA: A teacher with an associate's degree[5] in early childhood or a related field
- CDA: A teacher with a child development associate[6] credential

Estimating Direct Service and Infrastructure Costs

This analysis combines two cost categories: direct service costs and infrastructure costs, to derive a total per-child cost estimate for a fully implemented program. While direct costs vary with the levels of quality, these estimates assume infrastructure expenditures remain constant at 11.5 percent of the average total costs for each program type (three hour, six hour, and nine hour).

- Direct service costs are expenditures directly associated with day-to-day operations such as salaries,[7] employer-provided benefits,[8] in-service teacher training, food, transportation, support services for students, building operations and maintenance, administration, and research and data processing.
- Infrastructure costs are investments that contribute to the long-term success of the program, including facilities renovation, technical assistance and consultation, quality monitoring, outcome evaluation, and governance.

Using the data and methodology described above, this analysis calculates the per-child cost of each of the 12 levels of quality for three-, six-, and nine-hours-per-day pre-k programs. Each estimate assumes that programs are provided 185 days per year, roughly corresponding to the typical school year. Table 1 provides a summary of per-child costs, on both per-hour and per-year bases, for each combination of teacher-qualification/pay, class size, and hours per day. For example, the estimated costs of a six-hours-per-day program range from $5.17 per child hour at the lowest-quality level to $8.18 per child hour at the highest level. Annually, the lowest-quality program would cost about $5,741 per child, and the highest-quality program would cost about $9,076 per child.

The hours-per-day options represent (1) a half-day program offering two daily sessions (three hours each), (2) a school-day session (six hours), and (3) a workday session (nine hours). A longer program day can provide extended learning opportunities for children and greater support for working families. Importantly, per-child costs tend to decrease as program hours per day increase. For example, the hourly costs of operating a nine-hour program are up to 10 percent less than those of operating a six-hour program, with one exception: at the highest-quality level (BA-I, class size of 15), the per-child-hour cost of a nine-hour program is a fraction of a percent higher than that of a six-hour program.

The Relative Cost of Quality Improvements

The percent change in spending associated with increasing teacher qualifications or decreasing class size will depend on both the desired magnitude of improvements and the quality of the existing pre-k system. Table 2 provides a general, preliminary guide to assessing the potential increase in operational costs[9] for a state to raise program quality by improving the standards under consideration.

For example, reducing the class size of a six-hour program with BA-II-level teachers from 20 to 15 children would increase the state's per-child-hour costs by approximately 20.5 percent. If that same program, instead, kept class sizes at 20 children but improved teacher quality to the BA-I level, the per-child-hour costs would increase by roughly 11.3 percent. By contrast, a state offering a six-hour program with a maximum class size of 20 and CDA teachers will find that reducing class size to 15 is less costly – 18.3 percent more per child hour – than improving teacher quality to the BA-I- level – 29.8 percent more in per-child-hour costs.

Again, the actual costs for different quality improvements will depend upon each state's current pre-k costs, quality level, and program design and goals. Taken together, Tables 1 and 2 serve as a rough guide to help policymakers assess the relative costs and potential benefits associated with increasing teacher qualifications, decreasing class size, or expanding the number of hours of pre-k per day.

Considerations When Interpreting the Cost Estimates

Several factors should be kept in mind when interpreting the cost figures presented here. First, as compared with estimated costs of other programs such as child care or K-12 education or with other pre-k spending estimates, the pre-k-cost estimates shown here may appear relatively high because they include an array of instructional support services and infrastructure costs.

Second, actual costs incurred by states may be more or less than those estimated here, depending upon available infrastructure, teacher corps, and other resources. Further, these estimates are based largely on national median cost figures and do not reflect the variation in costs by state, but they do fall within the range of state-reported per-child per-year costs.[10]

Table 1: Summary of Costs Per-Child-Hour and Per-Child-Year by Quality Level

	Per-Child Per-Hour Costs Class Size			Annual Per-Child Costs, 185 days per year Class Size		
Teacher Qualifications	**15**	**17**	**20**	**15**	**17**	**20**
3-Hour Program						
Bachelor's Degree I	$8.82	$8.12	$7.33	$ 4,893	$ 4,506	$ 4,071
Bachelor's Degree II	$7.91	$7.32	$6.66	$ 4,390	$ 4,062	$ 3,694
Associate's Degree	$7.11	$6.62	$6.06	$ 3,947	$ 3,672	$ 3,361
CDA	$6.76	$6.30	$5.79	$ 3,751	$ 3,499	$ 3,214
6-Hour Program						
Bachelor's Degree I	$8.18	$7.49	$6.72	$ 9,076	$ 8,313	$ 7,454
Bachelor's Degree II	$7.27	$6.69	$6.04	$ 8,070	$ 7,425	$ 6,700
Associate's Degree	$6.47	$5.99	$5.44	$ 7,184	$ 6,643	$ 6,035
CDA	$6.12	$5.67	$5.17	$ 6,792	$ 6,298	$ 5,741
9-Hour Program						
Bachelor's Degree I	$8.20	$7.42	$6.54	$13,649	$12,348	$10,884
Bachelor's Degree II	$7.14	$6.48	$5.74	$11,889	$10,795	$ 9,564
Associate's Degree	$6.21	$5.66	$5.05	$10,338	$ 9,427	$ 8,401
CDA	$5.80	$5.30	$4.74	$ 9,652	$ 8,821	$ 7,887

Notes: 1) Costs include direct and indirect service costs and system infrastructure costs except workforce development. 2) Data on teachers' salaries come from the "National Prekindergarten Study" (Gilliam 2006) and U.S. Department of Labor, Bureau of Labor Statistics 2007b (for Bachelor's Degree I).
Source: IWPR calculations

Table 2: Percent Cost Increases for Selected Quality Upgrades

Increase Teacher Qualifications

	Change in Hourly Cost Per Child			Change in Annual Cost Per Child		
	15	17	20	15	17	20
3-Hour Program						
CDA to BA I	30.4%	28.8%	26.6%	30.4%	28.8%	26.6%
BA II to BA I	11.5%	10.9%	10.2%	11.5%	11.2%	10.4%
AA to BA II	11.2%	10.6%	9.9%	11.2%	12.4%	11.4%
CDA to AA	5.2%	4.9%	4.6%	5.2%	4.9%	4.6%
6-Hour Program						
CDA to BA I	33.6%	32.0%	29.8%	33.6%	32.0%	29.8%
BA II to BA I	12.5%	12.0%	11.3%	12.5%	12.0%	11.3%
AA to BA II	12.3%	11.8%	11.0%	12.3%	11.8%	11.0%
CDA to AA	5.8%	5.5%	5.1%	5.8%	5.5%	5.1%
9-Hour Program						
CDA to BA I	41.4%	40.0%	38.0%	41.4%	40.0%	38.0%
BA II to BA I	14.8%	14.4%	13.8%	14.8%	14.4%	13.8%
AA to BA II	15.0%	14.5%	13.8%	15.0%	14.5%	13.8%
CDA to AA	7.1%	6.9%	6.5%	7.1%	6.9%	6.5%

Decrease Class Size

	Change in Hourly Cost Per Child			Change in Annual Cost Per Child		
	17 to 15	20 to 17	20 to 15	17 to 15	20 to 17	20 to 15
3-Hour Program						
BA I	8.6%	10.7%	20.2%	8.6%	10.7%	20.2%
BA II	8.1%	10.0%	18.9%	8.1%	10.0%	18.9%
AA	7.5%	9.2%	17.4%	7.5%	9.2%	17.4%
CDA	7.2%	8.8%	16.7%	7.2%	8.8%	16.7%
6-Hour Program						
BA I	9.2%	11.5%	21.8%	9.2%	11.5%	21.8%
BA II	8.7%	10.8%	20.5%	8.7%	10.8%	20.5%
AA	8.1%	10.1%	19.0%	8.1%	10.1%	19.0%
CDA	7.9%	9.7%	18.3%	7.9%	9.7%	18.3%
9-Hour Program						
BA I	10.5%	13.4%	25.4%	10.5%	13.4%	25.4%
BA II	10.1%	12.9%	24.3%	10.1%	12.9%	24.3%
AA	9.7%	12.2%	23.1%	9.7%	12.2%	23.1%
CDA	9.4%	11.9%	22.4%	9.4%	11.9%	22.4%

Notes: IWPR did not assume that class size reduction would result in program expansions, such as additional classrooms, teachers, and children served. Therefore, the cost increases associated with class size reduction presented here are due to the reduction in total number of children served and costs being spread out across fewer children.
Source: IWPR calculations based on Table 1.

Conclusion

As both publicly and privately operated early learning centers expand their participation in state-funded pre-k programs, it is important to recognize that program quality relies in large part on adequate funding. To reap the full benefits of pre-k, investments must support quality components such as small class size and highly qualified teachers. This brief and the complete study from which it is drawn are tools to help leaders consider expenditures associated with varying levels of pre-k quality and provide a starting point for discussions of needed investments. Among the key findings is that the relative costs of quality improvements differ depending on existing program design and quality features. Also, changes in per-child costs are not necessarily proportional to changes in the number of hours in a program day.

While the costs of upgrading pre-k quality can be substantial, research shows that the benefits outweigh those costs. High-quality pre-k improves children's school readiness and cognitive development and yields long-term benefits into adulthood. It also generates strong returns to state coffers by reducing other public expenditures and increasing income tax revenues. For all these reasons, pre-k has been called "an outstanding use of taxpayer money and one of the best investments [states] can make"[11] for their economic futures and for the futures of their youngest citizens.

This brief is based on the report "Meaningful Investments in Pre-K," published by the Institute for Women's Policy Research. The complete report is available on IWPR's website: www.iwpr.org.

Pre-K Now

1025 F Street, NW
Suite 900
Washington, DC
20004

202.862.9871 voice
202.862.9870 fax

www.preknow.org

Pre-K Now collaborates with state advocates and policy-makers to lead a movement for high-quality, voluntary pre-kindergarten for all three and four year olds. The following funders contribute to making this important work possible: The Pew Charitable Trusts, the David and Lucile Packard Foundation, the McCormick Tribune Foundation, the Foundation for Child Development, RGK Foundation, CityBridge Foundation, PNC Financial Services Group, and the Schumann Fund for New Jersey.

Endnotes

[1] By pre-kindergarten, we refer to educational programs for three- to five-year-old children that can take place in a number of settings, including schools, centers, and Head Start programs.

[2] Golin, Stacie Carolyn, Anne W. Mitchell, and Barbara Gault. 2004. *The Price of School Readiness: A Tool for Estimating the Cost of Universal Preschool in the States*. Washington, D.C.: Institute for Women's Policy Research.

[3] For the importance of teacher qualifications/pay, see: Howes, C. 1997. "Children's Experiences in Center-Based Child Care as a Function of Teacher Background and Adult: Child Ratio," *Merrill-Palmer Quarterly* Vol. 43: 404-425; Kelley, Pamela and Gregory Camilli. 2006. *The Impact of Teacher Education on Outcomes in Early Childhood Education: A Meta-analysis*, New Brunswick: National Institute for Early Education Research. For importance of class size and child-staff ratio, see: Barnett, W. Steven, Karen Schulman, and Rima Shore. 2004. "Class Size: What's the Best Fit?" *Preschool Policy Matters*, *Issue 9*, New Brunswick, NJ: National Institute for Early Education Research; Howes, C., D.A. Phillips and M. Whitebook. 1992. "Thresholds of Quality: Implications for the Social Development of Children in Center-Based Care," *Child Development* 63: 449-460; and Finn, J.D, S.B. Gerber, C. M. Achilles, J. and Boyd-Zaharias. 2001. "The Enduring Effects of Small Class Sizes," *Teachers College Record*, 103 (2), pp. 145-183

[4] BA-level teachers paid at kindergarten-level wages are included as a discrete quality standard because research suggests that adequate compensation for early learning professionals improves staff retention, attracts more qualified teachers, and leads to improved quality services for children. See for example: Park-Jadotte, Jennifer, Stacie Carolyn Golin, and Barbara Gault. 2002. *Building a Stronger Child Care Workforce: A Review of Studies of the Effectiveness of Public Compensation Initiatives*. Washington, DC: Institute for Women's Policy Research.

[5] An AA degree is typically defined as 60 college credits, equal to 180 hours of work a week for an academic term.

[6] The Child Development Associate (CDA) is a national credential begun in 1971 administered by the CDA National Council in Washington, DC. Eligibility for a preschool CDA requires a high school diploma (or GED), at least 120 hours of formal education across eight areas of early childhood education/child development/professional practice, and at least 480 hours of direct experience working with pre-k children.

[7] Salary estimates are derived from national median wages calculated through analysis of data from the "National Prekindergarten Study" (Walter Gilliam, 2006, Unpublished calculations of data from the "National Prekindergarten Study", conveyed through personal communication with authors), the Bureau of Labor Statistics' Occupational Employment Survey.

[8] Employer-provided benefits incorporated into our cost estimates include Social Security, Medicare, state and federal unemployment insurance, workers' compensation insurance, and health, life, and disability insurance. We also assume teachers receive pension benefits.

[9] Readers should remember that the cost estimates reported here do not include the full cost of workforce development for improving teacher credentials because of the high level of variance in costs associated with this type of investment.

[10] Barnett, Steven W., Jason T Hustedt, Laura E. Hawkinson and Kenneth B. Robin, 2006. *The State of Preschool: 2006 State Preschool Yearbook*, New Brunswick: National Institute for Early Education Research.

[11] Jennifer D. Jordan, "Pre-K Pays Off, Study Says," *The Providence Journal* (2007), http://www.projo.com/news/content/prek_study4_05-06-07_KA5G6QM.33a64ac.html.