



Equity and Excellence: African-American Children's Access to Quality Preschool

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The White House Initiative on Educational Excellence for African-Americans (WHIEEAA) has a mandate on behalf of African-American students to close the achievement gap. This goal requires attention to the full education continuum, from the early childhood years through adulthood. **Learning begins at birth and the preparation for learning starts well before birth. To solve the employment and education crises facing black children¹ and America we must first ensure that all children have access to high-quality early education.¹** Not only must we work towards providing African-American students with access to high-quality early education, we must also make a concerted effort to provide support for them inside and outside the classroom, extending through college completion and career entry. The first step to ensuring that African-American students grow up to become successful and healthy adults is to give them access to high-quality early education. To accomplish this, the WHIEEAA is working to ensure that all African-American children have a quality early start. We are honored to work with the National Institute for Early Education Research to ensure that all African-American students have access to high-quality early learning opportunities² starting at birth.

Introduction

For no other community of individuals is access to high quality early childhood education and childcare opportunities more essential than it is for African-Americans, as this paper shows.

¹ The terms "African-American" and "black" are used interchangeably throughout to refer to descendants of the African diaspora.

² "High-quality programs" as those employing highly skilled staff (with experience and credentials in child development or early learning related fields of study), maintaining small class sizes and high adult-to-student ratios, fostering language and resource-rich environments, employing age- and developmentally appropriate curricula, nurturing positive relationships, and facilitating consistent child and family engagement (Harvard University Center on the Developing Child).

The majority of children from low-income families, and African-American students in particular, are without access to high-quality early childhood education.² As this level of education has been shown to provide the foundation for students to be successful in school and in life, the lack of it can make students less likely to enter elementary school prepared for success.³

The “achievement gap” between students of different social and economic backgrounds can be directly linked to opportunity gaps, including lower access to high-quality education opportunities. Concerns about the achievement gap frequently focus on state and national standardized tests, beginning in grades 3 or 4. Over the past 40 years, the achievement gap has narrowed at all ages, with the largest gains being made for African-American children. Nevertheless, the academic achievement of this group of children remains far below that of White children and of Hispanic children, as well. These facts are well known.⁴ Less well known is that these differences in knowledge and skills appear well before grade 3, and there is little change in achievement gaps between ages five and eighteen.⁵ African-American children, and others whose educational needs are poorly met in the first five years of life, fall behind before they even start kindergarten. As we discuss in this brief, providing more equitable access to *good* early childhood education offers great potential for reducing the achievement gap for African-American children.

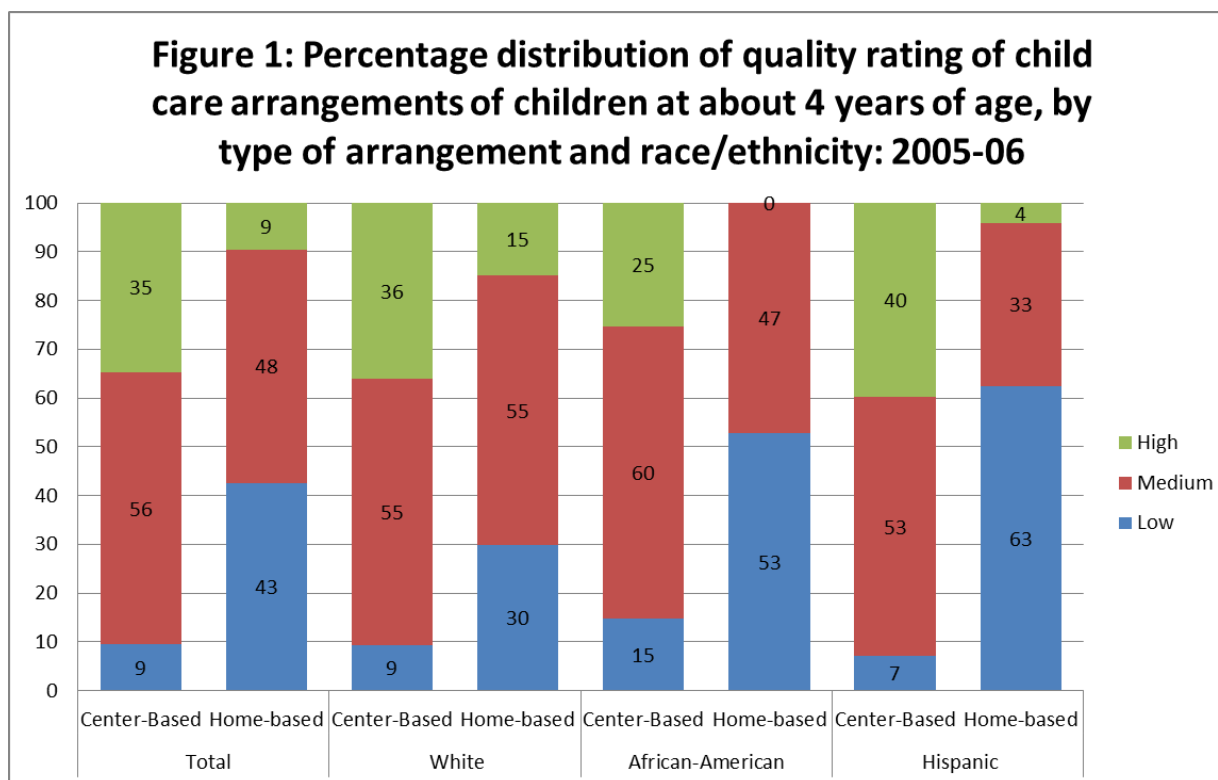
What is the quality of early care and education for African-American children?

Research has found that the best educational results of early childhood education come from high-quality programs,⁶ but there are stark differences in the quality of programs in which children are enrolled. Center-based and home-based facilities can be measured with widely used process quality tools (the Early Childhood Environment Rating Scale [ECERS] for center-based settings and the Family Day Care Rating Scale [FDCRS] for home-based settings), which can group settings into “low,” “medium,” or “high” quality. ECERS and FDCRS measure the quality of children’s experiences in terms of interactions, physical environment, and opportunities for stimulation and learning.

The National Center for Education Statistics sponsored observations of the quality of a national sample of preschool programs serving 4-year olds in 2005. As shown in Figure 1, 35 percent of all children enrolled in centers experienced high quality, while only 9 percent of those in home-based settings received high quality. Roughly half of centers and home-based settings were rated as “medium,” with more than half (60 percent) of center-based programs attended by black students rated in this category. Only 9 percent of centers were rated “low” in quality, but nearly half (43 percent) of home-based care settings were of low quality. Breaking this down by ethnicity, we see serious disparities affecting young black children. Hispanic children in centers were most likely to be in high quality classrooms, with 40 percent of the centers in which they

were enrolled rated as high quality, compared to 36 percent for white children and 25 percent for black children rated as “high.” And, 15 percent of the centers attended by black children were of low quality, almost double that for both white and Hispanic children.

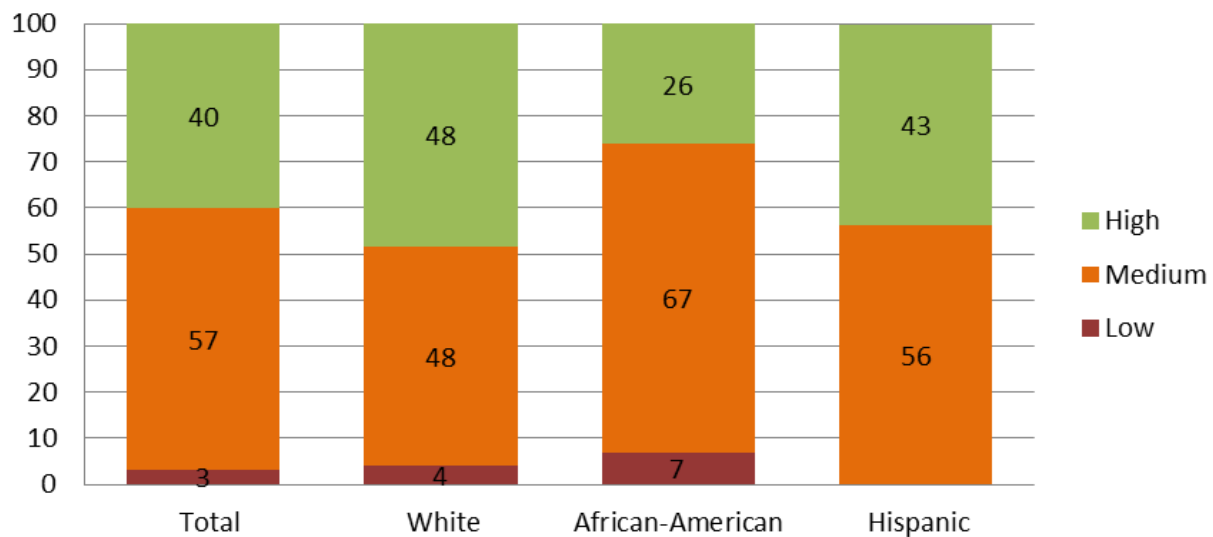
Even more alarming disparities are seen in home-based care. While only 30 percent of home-based care attended by white children received “low” ratings, more than half of those attended by black and Hispanic children (53 and 63 percent, respectively) were rated as “low.” Low- and medium-quality settings made up the full range of home-based settings for black children, with 0 percent of centers they attended rated as “high.”



Source: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort 9-month–Kindergarten Restricted-Use Data File and Electronic Codebook. Table 57. (December 2010)

The Head Start program deserves particular attention. This is not only the largest federal effort directed at early childhood education, but it also targets children of low-income families specifically, to try to close part of the Kindergarten readiness gap. As seen in Figure 2, the assessment of Head Start quality overall finds that only 3 percent of these centers are of low quality, though the majority (57 percent) were rated merely of medium quality.

Figure 2: Percentage distribution of quality rating of Head Start centers for children at about 4 years of age, by race/ethnicity: 2005-06



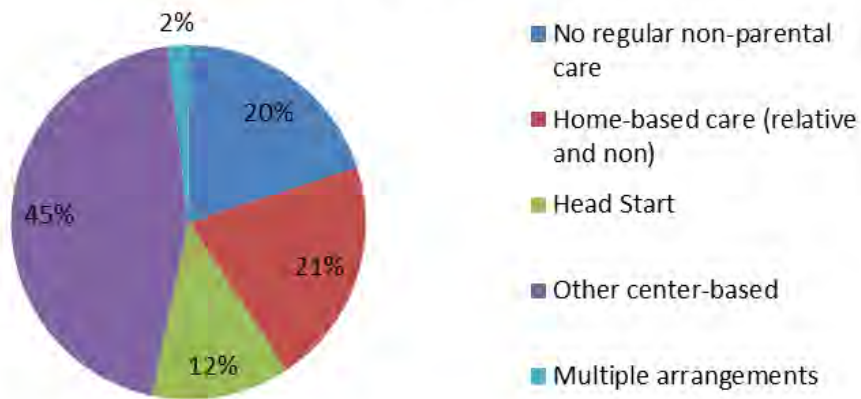
Source: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort 9-month–Kindergarten Restricted-Use Data File and Electronic Codebook. Table 57. (December 2010).

However, a significant difference is seen in the quality of Head Start programs in which black students are served compared to white and Hispanic students. While only 4 percent of the Head Start programs white students attended, and an indeterminate but very small number that Hispanic students attended were of low-quality Head Start programs, 7 percent that black students attended were of such quality. Sixty-seven percent that black students attended were of medium-quality and only about 26 percent were of high quality. The odds of a Head Start center that white or Hispanic students enrolled in was of high-quality is nearly 1 in 2 (48 and 43 percent, respectively), while only about 1 in 4 (26 percent) were for-black students.

Where are children served?

Four-year-olds nationwide are served largely in center-based settings. As seen in Figure 3, 13 percent were in Head Start classrooms and another 45 percent were in other center-based settings, for a total of 58 percent in 2005-06. Another 21 percent of 4-year-olds received primarily home-based services, either through relative or non-relative care. That left just 20 percent of 4-year-olds receiving no regular non-parental care or education.

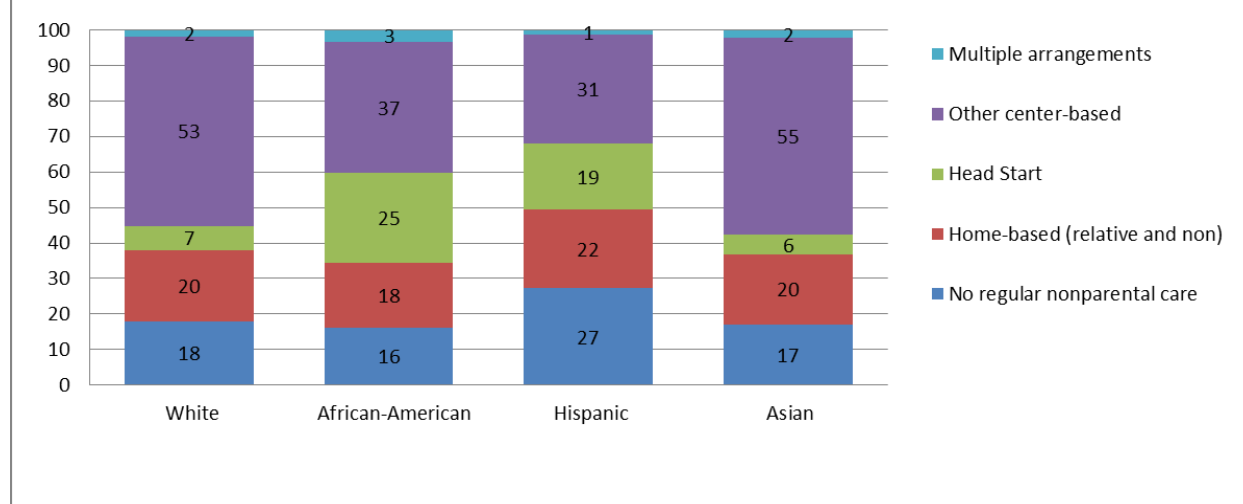
Figure 3: Primary Care Arrangement of 4-year-olds



Source: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort. Longitudinal 9-month–Kindergarten Restricted-Use Data File and Electronic Codebook. Table 56. (December 2010).

The primary care and education settings of 4-year-olds vary significantly by ethnicity, as Figure 4 shows. While nationally, 13 percent of 4-year-olds were served in Head Start in 2005-06, nearly one in five Hispanic children (19 percent) and one in four black children (25 percent) were enrolled in Head Start programs, compared to single-digit figures for both white and Asian students. They enrolled in other center-based programs at a higher rate than the national average (53 and 55 percent, respectively, compared to 45 percent across all ethnic groups) while only 37 percent of black and 31 percent of Hispanic students were served in these other settings. On the whole, 84 percent of black 4-year-olds were enrolled in some regular non-parental care program, while 73 percent of Hispanic 4-year olds were.

Figure 4: 4-year-old Enrollment, by Setting and Race



Source: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort 9-month–Kindergarten Restricted-Use Data File and Electronic Codebook. Table 56. (December 2010)

State-funded pre-K

State-funded pre-K refers to early childhood programs funded and administered by states with a focus specifically on education. While the program is controlled at the state level, most states use a mixed delivery setting that can include public schools, Head Start grantees, and private child care centers. The last decade was one of tremendous growth for state-funded pre-K, doubling from serving 14 percent of 4-year-olds nationwide in 2001-02 to 28 percent in 2011-12.⁷ The number of states providing pre-K increased from 37 to 40. However, the last decade also was one of financial difficulties; though states increased funding by \$1.65 billion (inflation-adjusted), enrollment increases outpaced funding growth so that state funding per child in constant dollars decreased from \$5,020 to \$3,841, a drop of 23 percent.⁸

What is the status of state-funded pre-k for African-American students?

While data on state-funded pre-k is not available by race/ethnicity, looking at those states with large populations of black preschool-aged children provides some insights. Twelve states have populations of African-American 4-year-olds in excess of 20,000: Georgia, Florida, Texas, New York, North Carolina, California, Illinois, Louisiana, Maryland, Ohio, Virginia, and South Carolina. Combined, they are home to more than 65 percent of the nation's young African-American children. These states are also particularly notable for their large-scale preschool efforts: the combined enrollments in state-funded pre-k totals 821,990 4-year-olds, or 71 percent of all 4-year-olds nationally in state-funded pre-K programs. Clearly, ensuring that these states

maintain high-quality pre-k programs that offer high levels of access is particularly important for African-American children.

Seven of these 12 states had enrollment rates for 4-year-olds in 2011-12 that exceeded the national average, while 4 others were substantially below the national average, and Illinois hit the average exactly. One state, Ohio enrolled a single-digit percentage of 4-year-olds. Ohio is also the only one of these states to decrease its enrollment since 2001-02, due largely to the elimination of one of its pre-k programs. California, Louisiana, Virginia, and North Carolina have all more than doubled their enrollment over the last decade, though in California this was the result of changing regulations that led to the reclassification of one of their programs as pre-K, rather than expanding enrollment per se. (When California guaranteed children in child care at least a full school year regardless of changes in parental employment status and income, it substantially reduced turnover and enabled this program to provide a sustained and substantive education.)

Table 1: Number and percentage of 4-year-olds enrolled in state-funded pre-k program in 12 states in 2011-12, and changes in enrollment: 2001-02 to 2011-12, and 2010-11 to 2011-12

State	2011-12 4-year-old Enrollment		Enrollment Change, 2001- 2002 to 2011-2012		Enrollment Change, 2010-11 to 2011-12	
	#	%	#	%	#	%
North Carolina	24,836	19%	23,596	1903%	-5,931	-19%
Virginia	16,618	16%	10,740	183%	737	5%
Louisiana	20,421	32%	12,902	172%	163	1%
California	93,866	18%	49,332	111%	-1,510	-2%
South Carolina	26,610	43%	10,960	70%	2,343	10%
New York	102,367	44%	38,868	61%	-1,078	-1%
Texas	203,143	51%	75,560	59%	2,962	1%
Maryland	25,678	35%	7,304	40%	-1,393	-5%
Georgia	82,868	59%	19,255	30%	260	0%
Illinois	46,897	28%	7,995	21%	-2,215	-5%
Ohio	3,564	2%	-10,321	-74%	-8	0%
Florida	175,122	79%	175,122	NA	10,734	7%

Source: Barnett, W.S., Carolan, M.E., Fitzgerald, J., & Squires, J.H. (2012). *The state of preschool 2012: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.

For state funded pre-K as for Head Start and private programs, enrollment alone does not guarantee access to a high quality early education. Program quality standards, together with funding and attention to continuous improvement of practice, are keys to quality. Among these 12 states, program quality standards vary dramatically, as seen in Table 2. Looking at the

10 benchmarks for quality standards tracked by NIEER, these states ranged from meeting only 2 out of 10 quality standards benchmarks (Texas) to the full 10 (North Carolina).

Table 2: Quality standards benchmarks for 12 states: 2012

State	Quality Standards Benchmarks (out of 10)
North Carolina	10
Georgia	8
Illinois	8
Maryland	8
Louisiana	8
New York	7
South Carolina	6.2
Virginia	6
California	4
Florida	3
Ohio	3
Texas	2

Source: Barnett, W.S., Carolan, M.E., Fitzgerald, J., & Squires, J.H. (2012). *The state of preschool 2012: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.

Even among states with relatively high standards, recent policy changes have caused concern regarding quality. Georgia lost two benchmarks this year when they increased maximum class size to 22 and moved away from the 10:1 student-teacher ratio. Louisiana and Virginia both reduced site visits state pre-k programs, losing benchmarks. Standards for site visits are an indicator of the state's commitment to monitoring and accountability, which are essential to ensuring that children receive effective early learning experiences in state-funded classrooms. Low standards in California, Florida, Ohio, and Texas are particularly concerning, as these four states combined serve almost half a million 4-year-olds, or 41 percent of all 4-year-olds enrolled in state-funded pre-k programs. Florida and Texas combine low standards with exceptionally low funding per child, a situation that seems destined to produce poor quality.

All 12 of these states have seen a decrease in per-child spending over the last year, ranging from only 2 percent in Ohio to 21 percent in Maryland and Georgia. Per-child funding reductions have been seen in many states since the recession, but all of these states except Maryland have seen real per-child funding fall since 2001-02. (California's decline is not evident because of a change in which programs are included as state pre-K, while Florida's program had not yet been created.) Increases in enrollment that are not adequately funded erode quality

and make it difficult to prevent much of the achievement gap problem for African-American and other children.

Table 3: Per child spending on state-funded pre-k programs in 12 states in 2011-12, and dollar and percentage change in spending: 2001-02, and 2010-11 to 2011-12

State	2011-2012 school year		Change in per child state spending, 2001-2002 to 2011-2012 (inflation adjusted)		Change in per child state spending, 2010-2011 to 2011-2012 (inflation adjusted)	
	Total spending from all known sources per child	State + TANF per child spending	Dollars	Percent	Dollars	Percent
Georgia	\$3,490	\$3,490	-\$1,961	-36%	-\$945	-21%
Maryland	\$8,599	\$3,609	\$1,226	51%	-\$946	-21%
California	\$5,069	\$4,136	NA	NA	-\$1,009	-20%
Texas	\$3,291	\$3,232	-\$965	-23%	-\$650	-17%
South Carolina	\$2,888	\$1,226	-\$932	-43%	-\$159	-11%
Illinois	\$3,210	\$3,210	-\$1,323	-29%	-\$349	-10%
Florida	\$2,281	\$2,281	NA	NA	-\$219	-9%
Louisiana	\$4,557	\$4,459	-\$1,606	-26%	-\$359	-7%
Virginia	\$5,872	\$3,778	-\$901	-19%	-\$152	-4%
New York	\$3,707	\$3,707	-\$1,599	-30%	-\$96	-3%
North Carolina	\$7,803	\$5,160	-\$2,520	-33%	-\$171	-3%
Ohio	\$3,980	\$3,980	-\$3,367	-46%	-\$87	-2%

Source: Barnett, W.S., Carolan, M.E., Fitzgerald, J., & Squires, J.H. (2012). *The state of preschool 2012: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.

Early care and education outcomes

Both small intensive preschool programs and large-scale preschool programs have been found to have positive impacts on participants. A recent meta-analysis, which provides a statistical summary of 123 studies on pre-k programs conducted since 1960, found that while there was some decline in effects after children started school, substantial average effects remained in place throughout the children's school years.⁹ Simulations indicated that reasonably well-designed preschool programs could produce effects large enough to close about half the later achievement gap. This meta-analysis, as well as one conducted on preschool programs outside of the United States¹⁰, found gains on cognitive tests, improved social and emotional development, and improved school outcomes, including reduced grade retention and special

education placement, as well as increased high school graduation rates.¹¹ No differences in outcomes were found by ethnicity of the children served.

There is substantial evidence for strong impacts of quality early care and education on child development and achievement for African-American children. Three of the best-known studies of the long-term effects of preschool programs had samples that were entirely or overwhelmingly African-American. The Abecedarian and Perry Preschool experiments both found a broad range of long-term effects on school success and achievement.¹² The Chicago longitudinal study, although not an experimental design, statistically controls for differences between those who did and did not attend a large-scale preschool program provided by the public schools of Chicago. Impacts on achievement in the Chicago study are similar to those of the earlier experiments, though somewhat smaller generally, as would be expected from the lower intensity of the program.

More recently, the national Head Start Impact Study suggests that, if anything, Head Start has somewhat more pronounced effects for African-American children than for children of other ethnic backgrounds. Sustained improvements in social-emotional development were found for African-American children who participated at age 4.¹³ Parents reported less hyperactive and aggressive behavior as well as fewer behavior problems.¹⁴ These children also had fewer problems with structured learning, and peer and teacher interactions, as well as better relationships with teachers.¹⁵ African-American children who had participated in Head Start as 4-year-olds reported more favorable school experiences than those in the control group.¹⁶

The Infant Health and Development Program is another true, multi-site experiment with long-term follow-up.¹⁷ The study looked at effects of a center-based program from age one to age three for low-birth-weight children in two groups, one very low birth weight and the other higher levels of low birth weight. The group with the higher levels is more comparable to disadvantaged populations in the United States generally, and the majority of the sample was African-American. Positive effects from the center-based program were found on cognitive development, including reading and math achievement through age 18. Again, if there were any differences in effectiveness, they favored African-American children.

Not all non-parental early care and education experiences are associated with positive outcomes for children and improved educational achievement. Some, particularly those of poor quality, may be associated with modest negative outcomes.¹⁸ Though this continues to be debated, such programs clearly do not produce large positive gains.¹⁹ The large scale meta-analysis of preschool program impacts indicated large differences in effects on cognitive development associated with differences in use of effective educational practices.²⁰ Such differences may not be assessed well in commonly used measures of quality, and this may contribute to the modest associations between these broad quality measures and children's

learning and development.²¹ On such measures, substantial contributions to learning and development may be linked to quality improvements to produce top-of-the-range programs, rather than movements from the bottom to middle.²²

Recent research on state-funded pre-k has found substantial effects for African-American children, similar to those found in the Chicago Longitudinal Study, though effects differ among programs in ways that are indicative of variations in quality.²³ Most of these state programs have less stringent income-eligibility requirements than Head Start and other older programs; some are open to all children regardless of income. Research on Louisiana's LA4 pre-k program found a reduction in both Kindergarten retention and special education placement for both African-American and white students who participated in the program.²⁴ Research on Oklahoma's universal pre-k program in Tulsa found achievement gains for African-American students. They also found that African-American students who were eligible for free lunch in Tulsa made larger gains in universal pre-k than comparable students in the Tulsa Head Start program. African-American students in the state's pre-k program had larger gains in prereading and prewriting skills than did their Head Start peers. The impact on math skills was roughly equal in both programs, which suggests that peer effects in universal programs might promote larger language and literacy, but not math, gains.²⁵ Finally, some research has found that non-poor African-American children benefit academically from high quality preschool to a greater extent than do other children.²⁶

Summary and conclusions

African-American children experience a serious opportunity gap in the form of limited access to high-quality early care and education, and this contributes to the substantial achievement gap for African-American children. Much of that achievement gap develops well before children enter Kindergarten. This gap is more difficult to close than it is to prevent. High quality early education is not the only means by which public policy can address the achievement gap, but it is one effective strategy that is not being sufficiently pursued. Research has found that African-American children have made substantial and persistent academic gains as a result of high quality early care and education. Unfortunately, African-American children have very limited access to high-quality early care and education, and they are more likely to experience low-quality early care. Substantial contributions to equity and excellence for African-American children from early care and education will require increased access to the most effective early childhood programs.

Recommendations

- Increase public support for high-quality preschool to expand access to African-American children and to ensure that the programs they attend are, in fact, of high quality.

Recent changes in Head Start's administration and recompetition are a step in the right direction from the federal government, but do not address the quality problem in other child care programs and state funded pre-k. The federal government and states both should support efforts to raise quality in all early learning programs for children birth to age 5, including Early Head Start, child care, and state-funded pre-k.

- As 45 percent of young African-American children live in poverty and 70 percent live in low-income families, programs limited to children in poverty will still leave many in the African-American population without access to quality preschool education, even if perfectly targeted, which is improbable.²⁷ Offering high-quality preschool to children living below 200 percent of the federal poverty level would reach most of the African-American children, but the most effective way to ensure that they have access to effective early education prior to Kindergarten would be to offer quality pre-k to all children.
- Some states with large African-American populations seem unlikely to set high standards or expand access significantly unless something changes. Federal incentives for states to expand access to state-funded pre-k, and to ensure that these programs are highly effective, would provide impetus for state policy changes that would greatly benefit African-American children.
- Ensure that data are routinely collected and reported on access to pre-k programs by income and ethnicity and that data on quality is collected periodically. Many states cannot report enrollment in pre-k by family background, so access to programs by African-American children is not routinely measured. The most recent national data with information on quality are from 2005. Another round of quality data should be collected to track change; ideally this would be done every five years to inform policy makers and the public. If this is planned for 2015, it will be ten years since the last collection of nationwide quality data.

References

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- ¹ Center on the Developing Child at Harvard University, *A Science-Based Framework for Early Childhood Policy: Using Evidence to Improve Outcomes in Learning, Behavior, and Health for Vulnerable Children*, Harvard University, 2007, http://developingchild.harvard.edu/index.php/resources/reports_and_working_papers/policy_framework/
- ² U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort 9-month–Kindergarten Restricted-Use Data File and Electronic Codebook. Table 56. (December 2010).
- ³ Debra J. Ackerman and W. Steven Barnett, Prepared for Kindergarten: What Does “Readiness” Mean?, National Institute for Early Education Research. March 2005, <http://nieer.org/resources/policyreports/report5.pdf>
- ⁴ Vanneman, A., Hamilton, L., Baldwin Anderson, J., and Rahman, T. (2009). *Achievement Gaps: How Black and White Students in Public Schools Perform in Mathematics and Reading on the National Assessment of Educational Progress*, (NCES 2009-455). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.
- ⁵ Cunha, F, Heckman, J.J., Lochner, L.J. and Masterov, Dimitriy V. (2006). Interpreting the Evidence on Life Cycle Skill Formation. In *Handbook of the Economics of Education*, edited by E. Hanushek and F. Welch. Amsterdam: North Holland, Chapter 12, pp. 697-812. National Center for Education Statistics (2013). *The Nation’s Report Card: Trends in Academic Progress 2012* (NCES 2013 456). Institute of Education Sciences, U.S. Department of Education, Washington, D.C. Vanneman, Hamilton, Baldwin Anderson, & Rhamn, 2009.
- ⁶ Barnett, W. S. (2011). Effectiveness of early educational intervention. *Science*, 333, 975-978.
- ⁷ Barnett, W.S., Carolan, M.E., Fitzgerald, J., & Squires, J.H. (2012). *The state of preschool 2012: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.
- ⁸ Barnett, Carolan, Fitzgerald, & Squires, 2012.
- ⁹ Camilli, G., Vargas, S., Ryan, S., & Barnett, W.S. (2010). Meta-analysis of the effects of early education interventions on cognitive and social development. *Teachers College Record*, 112(3), 579-620.
- ¹⁰ Nores, M., & Barnett, W. S. (2010). Benefits of early childhood interventions across the world: (Under) Investing in the very young. *Economics of Education Review*, 29(2), 271-282.
- ¹¹ Barnett, W.S. (2013). *Getting the Facts Right on Pre-K and the President’s Pre-K Proposal*. Policy Report. New Brunswick, NJ: National Institute for Early Education Research. <http://www.nieer.org/sites/nieer/files/Getting%20the%20Facts%20Right%20on%20Pre-K.pdf>
- ¹² Barnett, 2011.
- ¹³ Puma, M., Bell, S., Cook, R., Heid, C., Broene, P., Jenkins, F., Mashburn, A, & Downer, J. (2012). Third Grade Follow-up to the Head Start Impact Study Final Report, OPRE Report #2012-45, Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. Accessed at: http://www.acf.hhs.gov/sites/default/files/opre/head_start_report.pdf

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- ¹⁴ Puma, et al, 2012.
- ¹⁵ Puma, et al, 2012.
- ¹⁶ Puma, et al, 2012.
- ¹⁷ McCormick, M. C., Brooks-Gunn, J., Buka, S. L., Goldman, J., Yu, J., Salganik, M., & Casey, P. H. (2006). Early intervention in low birth weight premature infants: results at 18 years of age for the Infant Health and Development Program. *Pediatrics*, 117(3), 771-780.
- ¹⁸ Bernal, R. & Keane, M. (2011). Child care choices and children's cognitive achievement: The case of single mothers. *Journal of Labor Economics*, 29, 459-512.
- ¹⁹ Hawkinson, L.E., Griffen, A.S., Dong, N., & Maynard, R. (2013). The relationship between child care subsidies and children's cognitive development. *Early Childhood Research Quarterly*, 28, 388-404.
- ²⁰ Camilli et al., 2010.
- ²¹ Keys, T. D., Farkas, G., Burchinal, M. R., Duncan, G. J., Vandell, D. L., Li, W., Ruzek, E., & Howes, C. (2013). Preschool center quality and school readiness: Quality effects and variation by demographic and child characteristics. *Child Development*, 84(4), 1171-1190.
- ²² Burchinal, M., Vandergrift, N., Pianta, R., & Mashburn, A. (2010). Threshold analysis of association between child care quality and child outcomes for low-income children in pre-kindergarten programs. *Early Childhood Research Quarterly*, 25(2), 166-176.
- ²³ Wong, V. C., Cook, T. D. Barnett, W. S., & Jung, K. (2008). An effectiveness-based evaluation of five state pre-kindergarten programs. *Journal of Policy Analysis and Management*, 27(1), 122-154.
- ²⁴ Ramey, CT, S.L. & Stokes, B.R. (2009). Research evidence about program dosage and student achievement: effective public kindergarten programs in Maryland and Louisiana. In R. Pianta & C. Howes (Eds.), *The Promise of Pre-K* (pp. 79-105). Baltimore: Brookes Publishing. Retrieved from:
<http://www.picardcenter.org/newsroom/newsreleases/Documents/Research%20Evidence%20About%20Program%20Dosage%20and%20Student%20Achievement-%20Effective%20Public%20Prekindergarten%20Programs%20in%20Maryland%20and%20L.pdf>
- ²⁵ Gormley, W.T., Phillips, D., & Gayer, T. (2008, June). Preschool programs can boost school readiness. *Science*, 1723-1724. Retrieved from:
<http://nieer.org/resources/research/Gormley062708.pdf>
- ²⁶ Bassok, Daphna. 2010. Do black and Hispanic children benefit more from preschool? Understanding differences in preschool effects across racial groups. *Child Development*, 81(6): 1828-1845.
- ²⁷ Addy, S., Englehart, W., & Skinner, C. (2013). *Basic facts about low-income children: Children under 6 years, 2011*. NY: National Center for Children in Poverty.

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