

Promoting Health Equity Through Education Programs and Policies: Comprehensive, Center-Based Programs for Children of Low-Income Families to Foster Early Childhood Development (2000 Archived Review)

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Review Summary

Intervention Definition

Comprehensive, center-based early childhood development programs are defined as publicly funded comprehensive preschool programs designed to improve the cognitive and social development of children, aged 3 to 5 years, at risk because of family poverty. Programs reviewed included Head Start as well as other early childhood programs serving disadvantaged families.

Summary of Task Force Finding

The Community Preventive Services Task Force recommends publicly-funded, center-based, comprehensive early childhood development programs for low income children aged 3 to 5 years based on strong evidence of their effectiveness on preventing delay of cognitive development and increasing readiness to learn, as assessed by reductions in grade retention and placement in special education classes.

The Task Force finds insufficient evidence to determine the effectiveness of early childhood development programs on social cognition and social risk behaviors because findings were limited to the longitudinal results of a single program.

Evidence is also insufficient to determine the effectiveness of early childhood programs on child health screening outcomes and family outcomes because of a lack of sufficient comparative studies examining these outcomes.

About the Intervention

The early childhood development programs reviewed are “center-based” (i.e., in a public school or child development center), providing an alternative physical and social environment to the home.

Results from the Systematic Reviews

Sixteen studies (with 90 study arms) qualified for the review.

- The review assessed four different aspects of early childhood development: cognitive, social, health, and family.
 - Cognitive outcomes
 - Academic achievement scores increased by a median of 0.35 standard deviations (29 study arms).
 - School readiness increased by a median of 0.38 standard deviations (4 study arms)
 - IQ scores increased by a median of 0.43 standard deviations (16 study arms)
 - Although these results are positive, the influence of this gain in IQ on longer-term health and social outcomes is not known.
 - Grade retention: program participants were 13% less likely to be retained (“held back”) in grade level (7 study arms)
 - Placement in special education programs: participants were 14% less likely to be placed in special education programs (8 study arms)
 - Social outcomes (7 study arms)
 - Teen pregnancy, teen arrests, and welfare use decreased.
 - High school graduation, employment, and home ownership increased.
 - Health outcomes

- Program participation increased health screenings by 44% and dental screenings by 61% (one study)
- Family outcomes
 - Programs led to favorable effects on household outcomes, including educational attainment and employment status, household poverty level, and household receipt of public assistance (1 study).
 - Programs increased receipt of health screenings among siblings when compared with controls (1 study).

Study Characteristics

Study settings ranged from urban to rural, and the populations of different studies included people of African-American, Latino, Asian, Native American, and other ethnic or cultural backgrounds.

Applicability

These results should apply to most preschool children from disadvantaged backgrounds.

Economic Evidence

One study qualified for the systematic review of economic evidence. Estimates are shown in 1997 U.S. dollars.

- The study modeled the costs and benefits of the Perry Preschool program in a low-income area in Ypsilanti, Michigan.
 - The population consisted of 128 African-American three-year-olds of low socioeconomic status from a single school attendance area.
 - The study had a follow-up of 24 years, but lifetime benefits were estimated.
- The net benefit of the program was \$108,516 for males and \$110,333 for females.

Publications

Anderson LM, Shinn C, Fullilove MT, et al. [The effectiveness of early childhood development programs: A systematic review](http://www.thecommunityguide.org/social/soc-AJPM-evrev-eed.pdf). [www.thecommunityguide.org/social/soc-AJPM-evrev-eed.pdf] *Am J Prev Med* 2003;24(3S):S32-46.

Task Force on Community Preventive Services. [Recommendations to promote healthy social environments](http://www.thecommunityguide.org/social/soc-AJPM-recs.pdf). [www.thecommunityguide.org/social/soc-AJPM-recs.pdf] *Am J Prev Med* 2003;2003;24(3S):S21-4.

Task Force on Community Preventive Services. [The social environment](http://www.thecommunityguide.org/social/Social-Environment.pdf). [www.thecommunityguide.org/social/Social-Environment.pdf] In : Zaza S, Briss PA, Harris KW, eds. *The Guide to Community Preventive Services: What Works to Promote Health?* Atlanta (GA): Oxford University Press;2005:329-84 (Out of Print).

Task Force Finding

Intervention Definition

Child development is a powerful determinant of health in adult life: One indication of this is the strong relationship between measures of educational attainment and adult disease. The early years of life are a period of considerable opportunity for growth and vulnerability to harm. Children affected by poverty are especially vulnerable: A socioeconomic gradient effect in early life has been found in cognitive and behavioral development, and this modifiable socioeconomic factor affects readiness for school.

Early childhood development programs are designed to promote social competence and school readiness in children aged 3 to 5 years. Publicly funded programs such as Head Start target preschool children disadvantaged by poverty. The holistic view of the child incorporated by such programs addresses cognitive, social, emotional, and physical development, as well as the ability of the child's family to provide a home environment appropriate for healthy development. The health component of early childhood programs includes health screenings. The parental component provides job training and employment opportunities and encourages participation in social programs, ultimately supporting the child in all areas.

A child's readiness when starting school is related to motivation and intellectual performance in subsequent years; initial readiness is critical to establishing a trajectory for success in educational attainment. Improved social cognition and higher educational attainment are important intermediary determinants of health risk behaviors.

Task Force Finding (June 2000)*

Comprehensive, center-based, early childhood development programs for low income children are recommended on the basis of strong evidence of improved cognitive development and academic achievement. The Task Force looked for evidence of improvement in four general areas: cognitive development and academic achievement, children's behavioral and social outcomes, children's health screening, and family outcomes. Evidence of improved cognitive development and academic achievement was strong, and on the basis of their effectiveness in decreasing retention in grade and decreasing placements in special education classes, the Task Force recommends publicly-funded, center-based, comprehensive early childhood development programs for low income children aged 3 to 5 years.

Evidence was insufficient, however, to determine the effects of early childhood development programs on children's social outcomes, children's health screening outcomes, or family outcomes, primarily because too few studies of sufficient design and execution examined these outcomes (see the accompanying article). Although the body of published research is large, relatively few studies assess program impact in areas beyond cognitive gains (i.e., longer-term measures of health, well-being, and life success).

*From the following publication:

Task Force on Community Preventive Services. [Recommendations to promote healthy social environments.](http://www.thecommunityguide.org/social/soc-AJPM-recs.pdf)
[<http://www.thecommunityguide.org/social/soc-AJPM-recs.pdf>] *Am J Prev Med* 2003;24(3S):21-4.

Supporting Materials

Analytic Framework

See Figure 1 on page 36 of Anderson LM, Shinn C, Fullilove MT, et al. [The effectiveness of early childhood development programs: A systematic review](http://www.thecommunityguide.org/social/soc-AJPM-evrev-eed.pdf). [www.thecommunityguide.org/social/soc-AJPM-evrev-eed.pdf] *Am J Prev Med* 2003;24(3S):S32-46.

Evidence Gaps

What are Evidence Gaps?

Each Community Preventive Services Task Force (Task Force) review identifies critical evidence gaps—areas where information is lacking. Evidence gaps can exist whether or not a recommendation is made. In cases when the Task Force finds insufficient evidence to determine whether an intervention strategy works, evidence gaps encourage researchers and program evaluators to conduct more effectiveness studies. When the Task Force recommends an intervention, evidence gaps highlight missing information that would help users determine if the intervention could meet their particular needs. For example, evidence may be needed to determine where the intervention will work, with which populations, how much it will cost to implement, whether it will provide adequate return on investment, or how users should structure or deliver the intervention to ensure effectiveness. Finally, evidence may be missing for outcomes different from those on which the Task Force recommendation is based.

Identified Evidence Gaps

The search for suitable studies evaluating the effectiveness of early childhood development programs on factors other than intellectual functioning revealed significant gaps in research. Although the body of published research is large, relatively few studies assess program impact on subsequent health, well-being, and social success. A 1997 Government Accounting Office report on Head Start found the body of research inadequate for drawing conclusions about its national impact due to a limited focus on short-term cognitive measures. The report also noted important methodological and design weaknesses, such as non-comparability of comparison groups and lack of the large representative samples necessary to produce results that can be generalized to the national program.

The lack of scientific evidence about social outcomes, child health screening outcomes, and family outcomes is noteworthy, especially because these outcomes relate specifically to program objectives and mandated components in Head Start programs. In terms of social outcomes, a lack of standardized measures and the challenges of implementing longitudinal follow-up may have contributed to the paucity of evidence in this important domain. New research funded by the U.S. Department of Health and Human Services, including the National Head Start Impact Study and the Quality Research Consortium II, holds promise of providing more information on social and emotional development, communications skills, physical well-being, and the family effects of Head Start programs.

It is encouraging that, in addition to the high level of national attention generated by the results of the Perry Preschool program, other promising longitudinal studies with strong research designs examining the impact of early childhood development programs have recently been published and have garnered interdisciplinary interest. (These studies were not included in our systematic review because they did not compare participation in comprehensive ECD programs with nonparticipation). One such study looked at the long-term (15-year) effects of the Chicago Child-Parent Center Program, compared with other early childhood intervention programs, on educational achievement and juvenile arrest among

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low-income African-American children in Chicago. Another longitudinal study examined the relation of the quality of preschool child care to children’s development during their preschool years, and subsequently as they moved into a formal elementary education system. The need still exists, though, for additional studies of strong experimental or quasi-experimental research design using appropriate social, health, and family outcome measures to generate sufficient scientific evidence of the effects of early childhood development programs in these domains.

Research also needs to be expanded to closely examine core characteristics of effective and efficient early childhood development programs: teacher-student ratio, curriculum structure, optimum intensity (i.e., hours per day, months per year), qualifications of program staff, and levels of parental involvement.

Finally, the complex interactions of biology, individual and family characteristics, and the social and physical environments posited by the Community Guide’s social environment and health logic model underscore the need for additional research, consistent with an ecological perspective. Although there is strong evidence from early childhood intervention studies that improvements in cognitive function can translate into early school success, understanding the full impact of childhood social environments on later life experiences will require an interdisciplinary, multilevel research approach. The Office of Behavioral and Social Science Research of the National Institutes of Health has called for integrated sociobehavioral and biomedical research, and an example of this kind of undertaking can be found in a collaborative study authorized by the Children’s Health Act of 2000. This act authorizes the National Institute for Child Health and Development to collaborate with the Centers for Disease Control and Prevention, the National Institute for Environmental Health Science, and the Environmental Protection Agency to conduct a national longitudinal study of environmental influences (including physical, chemical, biological, and psychosocial) on children’s health and development. This interdisciplinary research will be critical to generating needed information for policy decisions on funding and coordination of early childhood development programs within the context of interrelated community services. Current levels of federal and state funding for early childhood development programs are not adequate to support accessible, quality services for the number of at-risk children who could potentially benefit from participation.

Summary Evidence Tables

Studies measuring the effect of early childhood development programs on cognitive, social, preventive health services, and family outcomes.

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Cognitive as measured by academic achievement tests					
Lazar et al., 1982 ¹	Greatest, Good	Various early childhood programs that were center-based, home-based, or combined but all served “at-risk” children	Math & reading achievement tests (range: 185–351, math; 249–447, reading)	Math: 3rd–6th grade; Reading: 3rd–6th grade	Math: .35; .22; .22; .02; Reading: .28; .12; .18; .04

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Schweinhart et al., 1993 ²	Greatest, Good	Perry Preschool	California achievement tests (123)	2, 3, 4, 5, 6, 9 years	.33, .34, .37, .33, .14, .68
Ramey et al., 1991 ³	Greatest, Good	Carolina Abecedarian Project (earliest version, through age 8, of Campbell & Ramey 1994 ⁴ & 1995 ⁵)	WJ-R; CAT (96)	1–2 yr	WJ-R: .89, reading; .45, math; CAT: .74, reading; .81, math
Campbell et al. 1994 ⁴	Greatest, Good	Carolina Abecedarian Project (Study has 4 groups: EE, EC, CE, CC) data reported here are for preschool vs. no preschool only (age 12 follow-up)	WJ-R (96)	6–7 yr	.48 reading; .35 math; .41 writing; .61 knowledge
Campbell et al., 1995 ⁵	Greatest, Good	Carolina Abecedarian Project (same intervention as Campbell & Ramey, 1994 ⁴) (age 15 follow-up)	WJ-R (96)	10 yr	.44 reading; .44 math
Schweinhart et al., 1986 ⁶	Greatest, Good	High/Scope Preschool	CAT (54)	2 yr	.14
Eisenberg et al., 1966 ⁷	Greatest, Fair	Head Start	PPVT (781)	1 yr	.52
Howard et al., 1967 ⁸	Greatest, Fair	Head Start	PPVT (66)	1 yr	.48 (no preschool)
Lee et al., 1988 ⁹	Moderate, Good	Head Start	PPVT (969)	1 yr	.26 (no preschool); .40 (other preschool)

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Lee et al., 1990 ¹⁰	Moderate, Good	Head Start (follow-up of 1988 study)	Cooperative primary test (969)	2 yr	Insufficient data to compute effect
Copple et al., 1987 ¹¹	Moderate, Fair	Philadelphia Head Start	WRAT; CAT; Metropolitan Achievement test (10,125)	Various, from 1–5 yr	Insufficient data to compute effect size, no significant effects reported
Barnett et al., 1987 ¹²	Moderate, Fair	S. Carolina implementation of High/Scope preschool curriculum	BSAP (389)	1 yr	Insufficient data to compute effect size, positive effects for black students and boys reported
Bee, 1981 ¹³	Moderate, Fair	Head Start	Metropolitan Reading Test (120)	1 yr	-.61 (favored control group)
Hebbeler, 1985 ¹⁴	Moderate, Limited	Head Start	ITBS or CAT (1393)	Various, from 3–9 yr	Insufficient data to compute effect size, positive effects reported
Cognitive as measured by IQ					
Lazar et al., 1982 ¹	Greatest, Good	Various ECD programs	WISC	After 1 yr; after 3–4 yr	.43; .14
Ramey et al., 1991 ³	Greatest, Good	Carolina Abecedarian Project (age 8 follow-up)	WPPSI; WISC-R (96)	From 1–3 yr	.5 WPPSI; .46 WISC at age 6.5; .2 WISC-R
Campbell et al., 1994 ⁴	Greatest, Good	Carolina Abecedarian Project (age 12 follow-up)	WISC-R (96)	6–7 yr	.44

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Campbell et al., 1995 ⁵	Greatest, Good	Carolina Abecedarian Project (age 15 follow-up)	WISC-R, age 15 (96)	10 yr	.35
Zigler et al., 1982 ¹⁵	Greatest, Good	Head Start	Stanford-Binet (84)	1 yr	.54
Schweinhart et al., 1986 ⁶	Greatest, Good	High/Scope preschool	Stanford-Binet from K–2nd grade; WISC at age 10 (54)	From 1–3 yr	2.2 (1 yr of preschool); 1.4 (2 yr of preschool); .9 (K); .8 1st grade; .36 2nd grade
Howard et al., 1967 ⁸	Greatest, Fair	Head Start	Stanford-Binet; PTI (66)	1 yr	.34 S-B; .43 PTI
Lee et al., 1990 ¹⁰	Moderate, Good	Head Start	Raven’s Progressive Matrices (969)	1 yr	–.05 compared with no preschool
Sontag et al., 1969 ¹⁶	Moderate, Fair	6 mo of Head Start	Stanford-Binet (86)	1 yr	.32
Cognitive as measured by school readiness tests					
Lee et al., 1990 ¹⁰	Moderate, Good	Head Start	California Preschool competency test (969)	1 yr	.34
Barnett et al., 1987 ¹²	Moderate, Fair	South Carolina preschool	CSAB (389)	1 yr	+6%
Bryant et al., 1998 ¹⁷	Moderate, Fair	Smart Start	Kindergarten Teacher Checklist (311)	1 yr	.34 (Smart Start vs no preschool for children in poverty)

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Sontag et al., 1969 ¹⁶	Moderate, Fair	Head Start	CPSI (86)	1 yr	.62
Handler, 1972 ¹⁸	Moderate, Limited	Head Start	CPSI (125)	1 yr	Subtest A: .16; Subtest B: -.14; Subtest C: .02; Subtest D: .14 <i>Appendix continued</i>
Cognitive as measured by rate of retention in grade					
Lazar et al., 1982 ¹	Greatest, good	Various early childhood programs. Some center-based, others home-based, or combined; all served "at-risk" children	Retention rates (682)	Up to 5 yr	-5%
Schweinhart et al., 1993 ²	Greatest, Good	Perry Preschool program	High school graduation rates (123)	Up to 15 yr	-2%
Ramey et al., 1991 ³	Greatest, Good	Carolina Abecedarian Project (age 8 follow-up)	Retention (96)	Up to 1 yr	-21%
Campbell et al., 1994 ⁴	Greatest, good	Carolina Abecedarian Project (age 12 follow-up)	Retention rates (96)	Up to 7 yr	-21%
Campbell et al., 1995 ⁵	Greatest, good	Carolina Abecedarian Project (age 15 follow-up)	Retention rates (96)	Up to 10 yr	-23%
Copple et al., 1987 ¹¹	Moderate, Fair	Philadelphia Head Start & Get Set	Retention rates (10125)	Various	No data to compute
Bee, 1981 ¹³	Moderate, fair	Head Start	Retention (120)	Various, 1-2 yr	-25%

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Hebbeler, 1985 ¹⁴	Moderate, Limited	Head Start	Retention rates (1393)	Various	No data to compute, and no significant difference reported
Cognitive as measured by placement in special education					
Lazar et al., 1982 ¹	Greatest, Good	Various	Special ed placement (524)	Up to 10 yr	-15%
Berrueta-Clement et al., 1984 ¹⁹	Greatest, Good	Perry Preschool program	Special ed placement (123)	Up to 15 yr	-12%
Campbell et al., 1994 ⁴	Greatest, Good	Carolina Abecedarian Project (age 12 follow-up)	Special ed placement (96)	Up to 7 yr	-36%
Campbell et al., 1995 ⁵	Greatest, Good	Carolina Abecedarian Project (age 15 follow-up)	Special ed placement (96)	Up to 10 yr	-23%
Barnett et al., 1987 ¹²	Moderate, Fair	South Carolina preschool	Special ed placement (389)	Up to 2 yr	-6%
Bee, 1981 ¹³	Moderate, Fair	Head Start	Special ed placement (120)	Up to 2 yr	-20%
Social as measured by behavioral assessment of social interaction					
Malakoff et al., 1998 ²⁰	Greatest, Fair	Head Start	Persistence at challenging task and intrinsic motivation (78)	Immediately following	.38
Lee et al., 1990 ¹⁰	Moderate, Good	Head Start	Schaefer Behavior Inventory (646)	1 yr	-.29

Appendix continued

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Sklerov, 1974 ²¹	Moderate, Fair	Head Start	Modification of Matching Familiar Figures test to measure latency in response time (32)	Immediately following	1.82
Social as measured by decreases in social risk behaviors					
Schweinhart et al., 1986 ⁶	Greatest, Good	High/Scope vs DISTAR	APL High (measure of social competence), and self-report of delinquent acts (54)	Through age 15	.35 (APL); .60 for delinquency scale
Berrueta- Clement et al., 1984 ¹⁹	Greatest, Good	Perry Preschool program	Employment status; teen arrests; teen pregnancies; welfare payment (123)	Through age 19	+27% -20% -49% -14%
Schweinhart et al., 1993 ²	Greatest, Good	Perry Preschool program	High school graduation; female employed; earnings >\$1000/mo; home ownership; use of social services	Through age 27	+17% +25% +30% +23% -21%
Health outcomes as measured by preventive services					
Hale et al., 1990 ²²	Greatest, Fair	Head Start	Record review of health screenings; dental exam (78)	+44% +61%	

Author(s), Date	Design suitability, Quality	Intervention	Measure used (Sample size)	Measurement time (in years from intervention)	Effect size
Hale et al., 1990 ²²	Greatest, Fair	Head Start	Siblings of children in Head Start vs control for health screenings and immunization rates (78)	+11%	
Oyemade et al., 1989 ²³	Least, Good	Head Start	Mother H.S. graduate; father H.S. graduate; income above poverty; mother employed; father employed; receiving welfare (205)	+4% +3% +7.4% +21.6% +5.8% -11%	

ECD, early childhood development; S-B, Stanford-Binet;

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Included Studies – Effectiveness Review

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Barnett WS. Lives in the balance: age-27 benefit-cost analysis of the High/Scope Perry Preschool Program. Ypsilanti, MI: High/Scope Press, 1996.

Search Strategy

We searched in five computerized databases: PsychInfo, Educational Resource Information Center (ERIC), Medline, Social Science Search, and the Head Start Bureau research database. Published annotated bibliographies on Head Start and other early childhood development research, reference lists of reviewed articles, meta-analyses, and Internet resources were also examined, as were referrals from specialists in the field. To be included in the reviews of effectiveness, studies had to:

- Document an evaluation of an early childhood development program within the United States
- Be published in English between 1965 and 2000
- Compare outcomes among groups of people exposed to the intervention with outcomes among groups of people not exposed or less exposed to the intervention (whether the comparison was concurrent between groups or before-and-after within groups)
- Measure outcomes defined by the analytic framework for the intervention

Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

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