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Pediatrics 2005;116;144-152
DOI: 10.1542/peds.2004-2515

This information is current as of July 1, 2005

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://www.pediatrics.org/cgi/content/full/116/1/144>

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American Academy of Pediatrics

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The Brookline Early Education Project: A 25-Year Follow-up Study of a Family-Centered Early Health and Development Intervention

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ABSTRACT. *Background.* Clinicians, scientists, and policy makers are increasingly taking interest in the long-term outcomes of early intervention programs undertaken during the 1960s and 1970s, which were intended to improve young children's health and educational prospects. The Brookline Early Education Project (BEEP) was an innovative, community-based program that provided health and developmental services for children and their families from 3 months before birth until entry into kindergarten. It was open to all families in the town of Brookline and to families from neighboring Boston, to include a mixture of families from suburban and urban communities. The goal of the project, which was administered by the Brookline Public Schools, was to ensure that children would enter kindergarten healthy and ready to learn.

Objective. Outcome studies of BEEP and comparison children during kindergarten and second grade demonstrated the program's effectiveness during the early school years. The goal of this follow-up study was to test the hypotheses that BEEP participants, in comparison with their peers, would have higher levels of educational attainment, higher incomes, and more positive health behaviors, mental health, and health efficacy during the young adult period.

Methods. Participants were young adults who were enrolled in the BEEP project from 1973 to 1978. Comparison subjects were young adults in Boston and Brookline who did not participate in BEEP but were matched to the BEEP group with respect to age, ethnicity, mother's educational level, and neighborhood (during youth). A total of 169 children were enrolled originally in BEEP and monitored through second grade. The follow-up sample included a total of 120 young adults who had participated in BEEP as children. The sample differed from the original BEEP sample in having a slightly larger proportion of college-educated mothers and a slightly smaller proportion of urban families but otherwise resembled the original BEEP sample. The demographic features of the

BEEP and comparison samples were similar. The young adults were asked to complete a survey that focused on the major domains of educational/functional outcomes and health/well-being. The study used a quasi-experimental causal-comparative design involving quantitative analyses of differences between the BEEP program and comparison groups, stratified according to community. Hypotheses were tested with analysis of variance and multivariate analysis of variance techniques. Analyses of the hypotheses included the main effects of group (BEEP versus comparison sample) and community (suburban versus urban location), as well as their interaction.

Results. Young adults from the suburban community had higher levels of educational attainment than did those in the urban group, with little difference between the suburban BEEP and comparison groups. In the urban group, participation in the BEEP program was associated with completing >1 additional year of schooling. Fewer BEEP young adults reported having a low income (less than \$20 000); the income differences were accounted for largely by the urban participants. The percentage of subjects with private health insurance was significantly lower in the urban group overall, but the BEEP urban group had higher rates of private insurance than did the comparison group. More than 80% of both suburban samples reported being in very good or excellent health; the 2 urban groups had significantly lower ratings, with 64% of the BEEP group and only 41.67% of the comparison group reaching this standard. Overall, suburban participants reported more positive health behaviors, more perceived competence, and less depression. Among the urban samples, however, participation in BEEP was associated with higher levels of health efficacy, more positive health behaviors, and less depression than their peers.

Conclusions. No previous study has focused as extensively on health-related outcomes of early education programs. BEEP participants living in urban communities had advantages over their peers in educational attainment, income, health, and well-being. The educational advantages found for BEEP participants in the early years of schooling included executive skills such as planning, organizing, and completing school-related tasks. It is likely that these early advantages in executive function extended beyond education-related tasks to other activities as participants became responsible for their own lives. The long-term benefits revealed in this study are consistent with the findings of previous long-term studies that indicated that participants in high-quality intervention programs are less likely to cost taxpayers money for health, educational, and public assistance services. The BEEP program appears to have somewhat blunted differences between the urban and suburban groups. The results of this study add to the growing body of findings that indicate that long-term benefits occur as the result of

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Accepted for publication Jan 20, 2005.

doi:10.1542/peds.2004-2515

This study was presented in part at the Presidential Plenary of the annual meeting of the Ambulatory Pediatrics Association; May 2-4, 2004; San Francisco, CA.

No conflict of interest declared.

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well-designed, intensive, comprehensive early education. The health benefits add a unique and important extension to the findings of other studies. *Pediatrics* 2005;116:144–152; *child development, early education, longitudinal follow-up, mental health.*

ABBREVIATIONS. BEEP, Brookline Early Education Project; METCO, Metropolitan Educational Collaborative; ANOVA, analysis of variance.

Health and education are linked intimately. Healthy children learn better than those who are not well, either physically or emotionally.^{1–5} Children in families with low educational opportunity are at increased risk for a wide variety of negative health and developmental outcomes.^{6–8} Experience with Project Head Start, which begins in the preschool period, has indicated the promise of health and developmental interventions for young children.⁹ Responding to evidence about the importance of early brain development,¹⁰ program planners and policy makers are investigating ways in which integrating health and early educational services for infants and young children can enhance growth and development and promote health and healthy lifestyles. Efforts such as Healthy Children Ready to Learn,¹¹ Success by 6,¹² Healthy Steps,¹³ and Smart Start¹⁴ are all based on the premise that such early integration of health and education will have long-term benefits. Pediatric investigators are calling increasingly for a new look at the ways in which pediatrics and early childhood educational efforts can be coordinated more effectively.¹⁵ Although the integration of professional services is one critical aspect of early intervention, there is increasing evidence that family involvement in planning and implementation of such efforts can enhance the long-term impact.¹⁰

Evidence is now accumulating that several of the high-quality early education projects initiated in the 1960s and 1970s have had benefits into the school years and even into adult life.^{16,17} Investigators of the long-term benefits of Head Start documented the effectiveness of high-quality programs in promoting success and achievement in elementary school.¹⁸ Follow-up studies of participants in the Perry Preschool Project, which focused on black children who were born into families living in poverty, indicated advantages at age 27 for participants, in terms of higher levels of educational attainment, higher incomes, and lower arrest rates.¹⁹ In studies of young adults who had participated in the Abecedarian Project, an early education program for children from low-income multirisk families, researchers noted benefits in terms of intellectual outcomes, educational attainment, and reduction of the teenage pregnancy rate.^{20,21} Research on the long-term effects of the Chicago Parent Centers, a Title I-funded, half-day preschool and extended elementary program for children 3 to 9 years of age operated by the Chicago Public Schools, revealed benefits similar to those of the Perry Preschool Project. Chicago Parent Centers participants had significantly lower rates of special

education placement, grade retention, and juvenile arrest, as well as a higher rate of high school completion.^{22,23} Although long-term follow-up studies of early childhood developmental interventions have focused on an array of educational and functional outcomes, generally they have not analyzed health outcomes.

This article reports on the 25-year follow-up study of the Brookline Early Education Project (BEEP). Launched in the early 1970s, the program was the nation's first health and developmental program sponsored by a school department and open to all children in the community.²⁴ In 1977, we described a group of "infants in a public school system."²⁵ Now that those infants are young adults, we investigated whether participation in BEEP was associated with long-term benefits in educational attainment and health functioning.

From 1972 to 1979, the Brookline (Massachusetts) Public Schools administered an innovative, community-based, child health and development program open to all families within the town and to families in an adjacent area of the city of Boston. The program's essential goal was to ensure that children in the project would enter kindergarten healthy and ready to learn. The project's interventions were based on a growing knowledge base indicating that children's developmental trajectories depended to a large extent on the nurturance and support they received in the first few years of their lives.²⁶ The major intervention was a multifaceted health and education program designed to engage the children's families as their first and best teachers.

The town of Brookline offered a unique opportunity to establish such a community-wide, early childhood program. The superintendent of schools decided to start public school accountability for the health and developmental well-being of children in Brookline from 3 months before birth. Because Brookline is a suburban town, the program also reached out to neighboring communities in Boston, to include a subset of children from an urban environment. This would ensure that the experience derived from the program could be generalized to a wider socioeconomic population. Brookline was participating in an educational collaboration with Boston called the Metropolitan Educational Collaborative (METCO), a voluntary program for families in Boston who wished to have their children attend public schools in suburban districts. Families from Boston who participated in BEEP could enroll their children in the Brookline schools through the METCO program. A truly multidisciplinary program, BEEP elicited professional commitment not only from the Brookline Public Schools but also from the Boston Children's Hospital, the Harvard Graduate School of Education and the Harvard School of Public Health. From the beginning, the project involved parents as consultants and relied increasingly on a very active parent advisory council for input.

BEEP children and families entered the experimental program in 1972 and 1973 and participated from birth until kindergarten entry. BEEP offered a range of health, educational, and social services to parents

and children, including home visits, parent groups, toy and book libraries, playgroups and prekindergarten programs, and health and developmental monitoring. In partnership with community pediatricians in Brookline and Boston, BEEP staff members particularly emphasized and facilitated access to regular health care services. As a result, all of the children had a pediatric primary health care provider.²⁷ A total of 282 children were enrolled initially in the project, and 169 were evaluated during second grade in local schools. One third of the families were from backgrounds other than Euro-American, primarily black, Latino, or Asian. The majority of families lost to attrition between program entry and second grade had moved beyond the Boston area. Nevertheless, the second grade sample was similar demographically to the sample at entry to BEEP.

At program entry, families in BEEP were assigned randomly to 1 of 3 levels of program intensity, A, B, or C, with A receiving the highest intensity of services and C the lowest intensity. As displayed in Table 1, children in all 3 levels of service received regular structured health and developmental evaluations (with feedback given to parents), a weekly playgroup at age 2, and a daily preschool program from 3 to 5 years of age. The playgroups and preschools operated with an orientation based on Piagetian constructivist developmental theory and focused on executive planning and organizing skills, consistent with the approach developed by the High/Scope Educational Research Foundation.^{28,29} Parents in all 3 intensity groups participated in regular parent conferences and parent information sessions.

Parents in the 2 most intensive levels of service (ie, A and B levels) participated in home visits and parent groups. Parents in the A level averaged 14 to 18 home visits and 8 parent group sessions during the children's first 2 years; those in the B level received

an average of 10 to 12 home visits and 5 parent group sessions in the first 2 years. Parents in the C level had access to the center to borrow toys or books but did not receive home visits or participate in parent groups. Parent groups continued to be available to parents in both the A and B levels of service during the playgroup and preschool years, although the number of groups in which parents could enroll varied according to intensity level. The parent groups were developed to reduce parental isolation and to provide a forum for shared information on topics related to the children's developmental phase (eg, "your 2-year-old") or to themes requested by parents (eg, sibling relationships, parenting alone, and managing a job and family).²⁴ Home visits, which were provided for parents in the A and B levels of service during the children's infant and toddler years, were focused on children's development. Educators, social workers, and psychologists, all of whom were parents, provided these visits, with a specific home visitor assigned to each family. Questions were developed to guide home visits and were based on the child's developmental phase; the questions guided discussions about topics such as the child's eating and sleeping patterns, stranger awareness and anxiety, sibling relationships, typical play, and suggestions for parental safety measures.²⁸ Home visits also included a time to discuss other issues and concerns of parents.

Evaluations of the program were conducted when children entered kindergarten and second grade. At both time points, there was evidence of strong, dose-related (A > B > C), positive effects for the BEEP children in social development and the acquisition of learning skills and strategies.²⁴ In addition, fewer BEEP children than comparison children (located in the same classrooms and matched with respect to background variables) were found to have either social or learning difficulties, at both time points.^{30,31}

TABLE 1. Array and Timing of BEEP Program Components

Timing		Child Assessment	Parent Education	Child Programs
Program Phase	Child's Age			
Infant	0-1 y	Neurologic examination (2 wk)	Orientation, discussions Home visits,* center visits (toy library and book library), parent groups*	Drop-in center (playrooms), respite child care*
		Physical, sensory, and developmental examination (3.5 mo)		
		Physical, sensory, and developmental examination (6.5 mo)		
Toddler	1-2 y	Physical, sensory, and developmental examination (11.5 mo)	Home visits,* center visits, parent groups,* parent-teacher conferences	Weekly playgroups, respite child care*
		Physical, sensory, and developmental examination (14.5 mo)		
		Physical, sensory, and developmental examination (24 mo)		
Prekindergarten	3 y	Dental screening	Center visits, parent groups*	Drop-in center, playgroups
		Physical, sensory, and developmental examination (30 mo)		
	4 y	Health history (36 mo)	Parent-teacher conferences, guided classroom observations*	Daily prekindergarten with optional extended day care
		Physical, sensory, and developmental examination (42 mo)		
5 y	Dental screening	Final conference		
	Lead and anemia screening			
		Entry into kindergarten examination		

* These components were available only to those in the moderate (B) and extensive (A) levels of program participation.

The early evaluations documented that, when children from families with lower levels of maternal education received a high-intensity program, they were able to achieve positive school and health outcomes comparable to those of children from more highly educated families.^{24,32}

The BEEP participants entered their mid-twenties at the turn of the century. The BEEPers Come of Age Study was designed to determine whether the children who had participated in BEEP demonstrated long-term benefits in health, educational, and psychological outcomes during the young adult phase of their lives. This information would complement the other studies in the field and would add information on the impact of a coordinated, community-based effort that was (1) offered to all children who lived in a specific suburban or urban environment, (2) family-centered, and (3) designed to provide services that were integrated across disciplines.

METHODS

Study Design

This study was designed to test the hypothesis that BEEP participants, in comparison with their peers, would have higher levels of educational attainment, higher incomes, and more positive health behaviors, mental health, and health efficacy during the young adult period. The participants in this investigation were young adults who were enrolled in the BEEP project in 1973–1978. Comparison subjects were young adults in Boston and Brookline who did not participate in BEEP but were matched to the BEEP group with respect to age, ethnicity, mother's educational level, and neighborhood (during youth). All recruitment procedures were reviewed and agreed to by the Boston Children's Hospital institutional review board.

Participants

BEEP Young Adult Sample

A total of 169 children were enrolled originally in BEEP and monitored through second grade. The follow-up sample discussed here consisted of a total of 120 young adults who had participated in BEEP as children. These young adults were located in several ways. Approximately one third were found through databases available on the Internet, such as telephone books and university e-mail address records. One third were located through follow-up notations in the BEEP records about the family's last known address, relatives, and parents' occupations. The final one third were located through referrals from former BEEP staff members, including a social worker, a BEEP teacher, the BEEP receptionist, and other BEEP families. In addition, we traced the last known addresses of METCO participants and Brookline High School graduates through contacts in those organizations. A letter was sent to each identified family, briefly outlining the prospect of a new study and requesting that the enclosed address verification form be completed and returned to us. Although 47 participants

could not be located, only 2 individuals who were contacted declined participation in the follow-up study. The sample used in this investigation differed from the original BEEP sample with respect to 3 characteristics. The follow-up sample included a greater proportion of college-educated mothers (76.9% vs 59.2%), although it is likely that some mothers had received a college degree in the years since BEEP, and a smaller proportion of urban families (20.8% vs 29.3%). There was a higher proportion of girls in the follow-up than in the original sample.

Comparison Sample

Because identifying characteristics of the original comparison groups were not recorded and thus members of those groups could not be located, we needed to constitute a new comparison group of young adults. To develop a comparable sample of individuals from Brookline, we contacted alumni and alumnae of Brookline public schools who had attended high school during the same years as the BEEP participants but had not participated in the BEEP program as young children. For the individuals from Boston in the BEEP sample, we selected Boston students with similar demographic features who had grown up in the same neighborhoods as the BEEP youngsters, had attended Boston public schools, and had not participated in BEEP. Demographic characteristics of the BEEP and comparison samples were very similar in relation to background characteristics (Table 2).

Surveys and Questionnaires

Domains

Once recruited, the young adults were asked to complete a survey composed of individual items and questionnaires. The survey items and scales were derived from a mixture of questions asked in similar studies and included a set of well-validated standardized instruments. The questions addressed 3 major domains, ie, (1) educational attainment, (2) functional measures, and (3) health/well-being.

Educational Measures

The questions on educational attainment were selected from the measures used in the follow-up study of young adults who had attended the Perry Preschool Project.¹⁹ These involved questions regarding the young adults' current level of education and their experiences in high school, including suspensions and expulsions.

Functional Measures

These questions were also selected from the Perry Preschool Project follow-up study and were used to assess the ability of the young adults in the sample to assume successfully the various responsibilities of adulthood. Questions on functioning included current income, receipt of public assistance, employment status, arrest rates, and voting (as an indicator of civic engagement). These items were selected to provide comparability of information across follow-up studies of participants in early education projects.¹⁹

TABLE 2. Demographic Characteristics of Participants According to Community and Program

Characteristic	Suburban				Urban			
	BEEP		Comparison		BEEP		Comparison	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender, male	44	46.3	44	46.3*	6	24.0	7	28.0*
Mean age, y	25.4		26.2*		25.4		25.1*	
Married/partnered	25	26.3	23	23.7*	3	12.0	6	24.0*
Have children	8	8.4	5	5.3*	11	44.0	7	28.0*
Mother's education, high school or less	8	10.9	10	10.5*	8	32.0	9	36.0*
Euro-American	89	93.4	90	94.7*	4	16.0	3	12.0*
Parents divorced	22	23.1	28	29.5*	12	48.0	6	24.0†

* Analysis conducted within community was not significant for BEEP-comparison difference.

† Analysis indicated BEEP-comparison differences at the trend level ($P < .09$).

The survey measured 3 aspects of health and well-being, ie, (1) health behaviors, (2) health efficacy, and (3) mental health. These aspects of health are related to the overall life functioning of young adults and are emphasized traditionally in health supervision guidelines such as Bright Futures for Children and Adolescents,³³ Bright Futures for Women,³⁴ and the American Medical Association *Guidelines for Adolescent Preventive Services*.³⁵

The Health Behaviors Scale is a 10-item, 7-point, Likert scale in which each item describes a behavior related to health (eg, "I maintain a consistent sleep pattern for my needs.") and the respondent indicates how often he or she engages in that behavior.³⁶ The content of the items focuses on behaviors related to smoking, drinking alcohol, exercising, caring for personal hygiene, sleeping, managing stress, getting medical check-ups, eating nutritiously, controlling weight, and using safety precautions. We added 2 items to the original scale, one about marijuana use and the other about use of other recreational drugs or chemicals. A summary score was used (Cronbach's $\alpha = .63$).

The Perceived Health Competence Scale is an 8-item, 5-point, Likert scale designed for use with young adults.³⁷ It describes an individual's views of his or her own competence in taking care of his or her own health (eg, "I handle myself well with respect to my health."). Cronbach's α for this sample on this scale was .87.

Depressive symptoms, an important aspect of mental health, were also measured. The Center for Epidemiologic Studies Depression Scale is a 20-item instrument that assesses the frequency of depressive symptoms during the previous 7-day period (eg, "I was bothered by things that usually don't bother me.").³⁸ For each item, the response options range from rarely or none of the time (scored as 0) to most or all of the time (scored as 3). In this sample, an internal consistency analysis yielded Cronbach's α of .91. We also included several questions about health service utilization, health promotion, and health status from the National Health Interview Study.³⁹ These are standard questions from the National Health Interview Study Basic Module.

Analyses

The study used a quasi-experimental causal-comparative design involving quantitative analyses of differences between the BEEP program and comparison groups, stratified according to community. At the time of the original BEEP program, the family advisory council thought that it was not in the best interest of the children to conduct analyses based on the constructs of race and ethnicity. As a result, BEEP data have never been analyzed with these constructs. Rather, all previous BEEP reports used mother's educational level as a proxy measure of socioeconomic status. For the purposes of the current work, we chose to use the suburban and urban experiences as potential influences on and social determinants of health, educational, and social outcomes. The focus on the types of communities in which the participants resided as children and youths is in keeping with current emphases on the role of community in supporting children's health and development.¹⁰

Hypotheses were tested by using analysis of variance (ANOVA) and multivariate ANOVA techniques. Analyses of hypotheses included the main effects of group (BEEP versus com-

parison sample) and community (suburban versus urban location) and their interaction.

RESULTS

Preliminary analyses indicated that gender differences were not significant either as a main effect or in interaction with group status (BEEP versus comparison); therefore, gender was omitted from the final analyses presented here. As seen in Table 3, we found significant differences in educational attainment, with advantages for the suburban group over the urban group [$F(1,238) = 48.13, P < .001$]. There was also a program-community interaction [$F(1,238) = 6.97, P < .01$]. Among those who had grown up in the urban community, participating in the BEEP program was associated with attaining >1 year of additional schooling. In contrast, the BEEP and comparison suburban samples were remarkably similar in their levels of educational attainment, with both groups reporting an average of 3.5 years of education beyond high school. In relation to the functional outcomes, significant program differences were found only in terms of income [$F(1,238) = 8.10, P < .01$], with fewer BEEP participants having low incomes (ie, less than \$20 000). There was also a significant program-community interaction [$F(1,238) = 7.76, P < .01$], showing that the income differences between BEEP participants and their peers were accounted for largely by the urban participants.

Table 4 contains findings from questions derived from the National Health Interview Survey. Nationally, in 1999, 83% of adults 18 to 44 years of age had private health insurance.³⁹ In the 2 suburban samples, the majority of subjects had private insurance, reflecting their high rate of employment. In the BEEP group, 79.57% had private insurance; a slightly (but not significantly) higher percentage of comparison group participants (81.52%) had private coverage. The percentage of those with private insurance was significantly lower in the urban group [$F(1,238) = 14.63, P < .001$], but a program-community interaction indicated that the BEEP urban group had higher rates of private insurance (68.0%) than did the comparison group (41.67%) [$F(1,238) = 4.43, P < .05$].

Nationally, 75% of adults 18 to 44 years of age report that they are in very good or excellent health.³⁹ More than 80% of both suburban samples

TABLE 3. ANOVA of Program and Community Effects for Young Adult Functional Status Indicators

	Suburban		Urban		ANOVA F		
	BEEP, %	Comparison, %	BEEP, %	Comparison, %	Program	Community	Program × Community
Employed	78.00	84.00	84.00	71.00	0.28	0.29	2.32
Income less than \$20 000	43.62	44.09	28.00	72.00	8.10*	0.62	7.76*
Public assistance	5.00	5.00	24.00	36.00	1.72	28.23†	1.62
Arrested	13.00	5.00	28.00	16.00	3.69‡	6.41§	0.19
Suspended from high school	5.32	9.57	8.00	20.00	3.26‡	2.12	0.74
Registered to vote	82.00	80.00	75.00	58.00	1.98	4.49§	1.15
Years of education, mean (SD)	15.40 (1.66)	15.61 (1.48)	14.32 (1.70)	13.20 (1.50)	3.31‡	48.13†	6.97*

* $P < .01$.
 † $P < .001$.
 ‡ $P < .10$.
 § $P < .05$.

TABLE 4. ANOVA of Program and Community Effects for Young Adult Health Indicators

Indicator	Suburban		Urban		ANOVA <i>F</i>		
	BEEP, %	Comparison, %	BEEP, %	Comparison, %	Program	Community	Program × Community
Private insurance	79.57	81.52	68.00	41.67	3.29*	14.63†	4.43‡
Regular source of care	76.00	78.00	88.00	75.00	0.68	0.39	0.96
Physician visit, >12 mo	23.46	24.10	21.74	10.00	0.60	1.21	0.74
Dental visit, >12 mo	25.00	32.53	43.48	35.00	0.01	1.73	1.01
Routine gynecologic visit in past 5 y (women)	98.00	92.00	95.00	95.00	0.49	0.01	0.49
Mental health visit in past 5 y	26.00	29.00	16.00	32.00	1.84	0.27	0.80
Untreated condition	31.00	16.00	30.00	42.00	0.05	3.09*	3.29*
Use condoms	29.49	32.10	39.13	26.09	0.45	0.05	1.00
Health rating of very good/excellent	81.91	82.61	64.00	41.67	2.71	20.02†	3.07*

* $P < .10$.† $P < .001$.‡ $P < .05$.

reported being in very good or excellent health. The 2 urban groups had significantly lower ratings, with 64% of the BEEP group and only 41.67% of the comparison group reporting this standard of health [$F(1,238) = 20.02, P < .001$]. Finally, the national figure for having a regular source of medical care is 82% for 25- to 44-year-old subjects.³⁹ The percentages of participants in this study who reported having a regular source of medical care were comparable across groups, ranging from 75% to 88%.

The means and SDs for 3 measures of health, including health behaviors, perceived health competence, and mental health are presented in Table 5. Because these 3 health outcomes were related conceptually and correlated statistically, they were analyzed as related dependent variables with multivariate ANOVA (Table 6). In relation to health and well-being, the overall BEEP-comparison difference approached significance [$F(3,228) = 2.51, P < .06$], the urban-suburban difference was significant [$F(3,228) = 8.94, P < .001$], and the interaction of program and community was significant [$F(3,228) = 2.68, P < .05$]. Overall, suburban participants, in comparison with urban participants, reported more positive health behaviors, more perceived competence, and less depression. Among the urban participants, however, participating in BEEP was associated with higher levels of health efficacy, more positive health behaviors, and less depression.

Analyses were also conducted within the BEEP sample, to examine whether program intensity was related to outcomes. Because of the sample size, we conducted these analyses for the sample as a whole, rather than stratifying according to community. We first checked to see whether the program intensity groups (ie, A, B, and C levels of service, as described above) differed in background characteristics, but we found no significant differences. In analyses of young adult outcomes, the 3 program intensity groups did not differ in levels of educational attainment [$F(2,117) = 0.41, P > .10$] but differed at the trend level in income [$F(2,117) = 2.46, P < .10$], with the young adults in the most intensive level of service reporting the highest incomes and those in the least intensive level reporting the lowest. Finally, although the mean differences in the 3 health outcomes all favored the A level service group, the omnibus test results were not significant.

DISCUSSION

The results of this investigation add to the growing evidence of the long-term benefits of comprehensive early education in promoting developmental and functional outcomes. In addition, they suggest that such comprehensive interventions can have a positive impact on participants' health. No prior study has focused as extensively on the health-related outcomes of early education programs. BEEP partici-

TABLE 5. Mean Scores and SDs for Young Adult Health Outcomes as a Function of Community and Program

Community	Young Adult Health Outcome Scores					
	Health Behaviors*		Perceived Health Competence†		Mental Health: Depression‡	
	Mean	SD	Mean	SD	Mean	SD
Suburban						
BEEP (<i>N</i> = 95)	65.04	8.4	30.62	6.5	11.16	9.1
Comparison (<i>N</i> = 95)	64.17	8.1	31.85	6.0	11.22	8.4
Urban						
BEEP (<i>N</i> = 25)	61.92	9.6	31.3	5.8	14.54	8.0
Comparison (<i>N</i> = 25)	57.25	9.0	27.9	4.1	22.03	14.4

Analyses are presented in Table 6.

* Higher scores indicate more positive behaviors.

† Higher scores indicate more perceived competence.

‡ Lower scores indicate fewer depressive symptoms.

TABLE 6. Multivariate and Univariate ANOVA for Program-Community Effects for Young Adult Health Outcomes

	Multivariate ANOVA, <i>F</i> (3,228)	ANOVA		
		Health Behaviors, <i>F</i> (1,230)	Perceived Health Competence, <i>F</i> (1,230)	Depression, <i>F</i> (1,230)
Program	2.51*	4.01†	1.23	6.07†
Community	8.94‡	13.21‡	2.81*	21.50‡
Program × community	2.68†	1.89	5.58†	5.90†

F ratios are Wilks' approximation of *F* values.

* *P* < .10.

† *P* < .05.

‡ *P* < .001.

pants, especially those living in urban communities, had advantages over their peers in terms of educational attainment, income, health, and well-being. The educational advantages were anticipated by the earlier evaluations of BEEP, in which children had more positive peer relationships and stronger skills in reading at kindergarten and fewer difficulties in executive strategies (such as planning, organizing, and completing their school-related tasks) in comparison with their peers in second grade classrooms. In addition to higher levels of education and income, however, BEEP participants appear to have more positive well-being and to be better caretakers of their own health. It is likely that the early advantages BEEP children displayed in executive function extended beyond education-related tasks to other activities as they became responsible for their own lives, especially in relation to making decisions about healthy behaviors. These findings point to an important, understudied, potential result of comprehensive, family-focused, early education programs.

The long-term benefits revealed in this study are also consistent with the findings of earlier studies that participants in high-quality early intervention programs are less likely to cost taxpayers money for health, educational, and public assistance services.⁴⁰ Young adults who have more education, higher income levels, more responsible health care behaviors, and a more positive sense of well-being than do comparable peers not only may be less costly to society but also are more likely to make a positive contribution. Although young adults are generally quite healthy, outcomes such as early death, HIV infection, teen pregnancy, and injuries are distributed unevenly among different racial and socioeconomic groups, with higher levels of poor outcomes among black and Latino youths, especially those living in low-income neighborhoods.⁴¹⁻⁴³ We found that those differences might have been blunted to some extent within the BEEP cohort and that the BEEP young adults who had grown up in urban neighborhoods resembled their BEEP peers who had grown up in suburban areas, in relation to health outcomes.

In relation to the effects of program intensity, we found little evidence that A, B, and C group differences were related to outcomes, although trends were in the direction predicted and sample sizes might have limited our ability to detect small or moderate effects. Nevertheless, the program as a

whole provided many services to all families, with similar child health and education services for all groups. In discussions of the effectiveness of early education programs, Ramey and Ramey⁴⁴ emphasized the importance of providing intense comprehensive services to produce sustained effects. Because even the lowest level of the BEEP program involved an array of child health, educational, and parental support services for children's birth to kindergarten years, our findings suggest that this intensive comprehensive array, rather than any one specific service, is associated with long-term educational and health benefits.

This study has several limitations, primarily the relatively small sample size, especially for the urban youths. The participants from the urban community were harder to locate, because many more young adults and parents from the urban community had moved without forwarding addresses. Also, if the original design had allowed for random assignment to program and comparison groups, with a way of identifying the comparison group participants so that they could be located in adulthood, a stronger causal conclusion could be reached about the program's effectiveness.

Nevertheless, program participation was associated clearly with important advantages for the young adults in the urban group. It is possible that the suburban-urban mixture of families in the BEEP program was central to those outcomes. It is also possible that the combination of a comprehensive early education program and the experience of education in a suburban school district was critical to the findings we report. In the urban BEEP sample, 44% of participants chose to attend suburban schools for at least part of their school experience and 20% attended suburban schools through completion of high school. The value of providing children with a combination of well-conceived early education programs and high-quality schools was stressed by researchers investigating the long-term effects of Head Start.⁴⁵ We speculate that the opportunity to attend suburban schools might have added to or sustained the positive effects of early education, although we cannot quantify those effects reliably, given the sample size.

CONCLUSIONS

The results of this study add to the growing body of findings that indicate that long-term benefits occur

as the result of well-designed, intensive, comprehensive, early education. BEEP was unique in its emphasis on children's health and development and in its emphasis on children expected to develop typically, rather than only on children perceived as vulnerable. Furthermore, BEEP was unusual in its provision of comprehensive early education in a public school setting. The educational benefits found here for urban youths are similar to those reported for other carefully implemented early education interventions, but the health benefits add a unique and important extension to those prior studies. Given the importance of healthy behaviors and adaptive mental health during the young adult years, these findings add an important dimension to the current national discussion about the benefits of early education.

There are significant implications of this study for pediatrics and for pediatric primary care. As pediatricians move increasingly to interdisciplinary collaboration with early educators and base pediatric visits on developmental phases, the BEEP experiment may provide useful blueprint elements for implementation. The data on the long-term health benefits of comprehensive early intervention can be useful for those advocating for enhancements of the traditional care model. Finally, BEEP was a family-centered intervention. Parental involvement in the planning and continuous execution of the program ensured the highest quality of curriculum, service delivery, and culturally appropriate support for young families.

ACKNOWLEDGMENTS

BEEP was supported by grants from the Robert Wood Johnson Foundation and the Carnegie Corporation of New York.

We thank the many participants in this study. We also appreciate the assistance of Marsha Canick, Roxana Caminos, and Barbara Smith, all former BEEP staff members. We are very grateful to the members of the Advisory Committee for the BEEPers Come of Age study, ie, Barbara Keogh, Deborah Klein Walker, Jackie Lerner, Barbara Murphy, Larry Schweinhart, Barbara Scotto, Terry Tivnan, Robert Weintraub, Michael Windle, and Mary Jane Yurchak. We thank Gloria Rudisch, Alan Balsam, and Robert Sperber from the Town of Brookline for all of their help, encouragement, and support. We also thank Barbara Finberg, Margaret Mahoney, and Ruby Hearn, without whose leadership, commitment, and support this work would not have been accomplished.

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THE GREEDIEST GENERATION

“As a baby boomer myself, I can be blunt: We boomers won’t be remembered as the ‘Greatest Generation.’ Rather, we’ll be scorned as the ‘Greedy Generation.’ . . . [T]he proportion of children below the poverty line is still 18 percent, the same as it was in 1966. And while almost all the elderly now have health insurance under Medicare, about 29 percent of children had no health insurance at all at some point in the last 12 months. One measure of how children have tumbled as a priority in America is that in 1960 we ranked 12th in infant mortality among nations in the world, while now 40 nations have infant mortality rates better than ours or equal to it. We’ve also lost ground in child vaccinations: the United States now ranks 84th in the world for measles immunizations and 89th for polio. . . . We boomers are also preying on children in a more insidious way: We’re running up their debts, both by creating new entitlement programs and by running budget deficits today. Laurence Kotlikoff, an economist and fiscal expert who with Scott Burns wrote the excellent and scary book ‘The Coming Generational Storm,’ calls this ‘fiscal child abuse.’ The book says that the Treasury Department commissioned a study by two economists of the United States’ long-term liabilities, for inclusion in the 2004 federal budget. The study found that the government faces a present value ‘fiscal gap’—the excess of expected payments over expected revenues—of \$51 trillion. That’s 11 times our official national debt and also greater than our total net worth, meaning that in some sense we’re bankrupt.”

Kristof ND. *New York Times*. April 30, 2005

Noted by JFL, MD

The Brookline Early Education Project: A 25-Year Follow-up Study of a Family-Centered Early Health and Development Intervention
Judith S. Palfrey, Penny Hauser-Cram, Martha B. Bronson, Marji Erickson Warfield,
Selcuk Sirin and Eugenia Chan
Pediatrics 2005;116;144-152
DOI: 10.1542/peds.2004-2515

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