Age-26 Cost-Benefit Analysis of the Child-Parent Center Early Education Program

Technical Report

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PREFACE

This document provides details of the methods employed by Reynolds, Temple, White, Ou, & Robertson (2009) in deriving the costs and benefits by age 26 years arising from participation in the Chicago Child-Parent Center (CPC) program, a high quality early childhood education program attended primarily by at risk African American children living in inner-city Chicago. For the age 26 cost-benefit analysis recent data on CPC program and comparison group participants from administrative records and self reports are used to revise the results reported in the age 21 costs-benefit analysis of the Title I Chicago Child-Parents Centers (Reynolds, Temple, Robertson, & Mann, 2002). Program costs and benefits reported in the age 21 analysis are employed in the age 26 analysis when more recent data are not available. Notable revisions include the re-estimation of savings associated with the CPC program effect on child abuse and neglect, private earnings and government tax revenues associated with the predicted CPC effect on educational attainment, and averted criminal justice system and victimization costs associated with the program effect on adult criminal behavior. Additions to the cost-benefit analysis include averted intangible criminal victimization costs, savings associated with reduced symptoms of depression (indentified in early adulthood), and reduced rates of substance misuse. In addition, the predicted CPC preschool effect on daily tobacco use is monetized; however, the value of the program effect on daily tobacco use is not included in the primary analysis of the CPC preschool program.

In this technical report, the estimated discounted costs and benefits related to three levels of intervention (preschool, school-age, and extended) are described. Program costs were incurred for up to six years after program entry at age 3, and program benefits are projected using information from the Chicago Longitudinal Study (CLS) on the effects of participation in the Chicago Child-Parent Centers. For additional information on the CPC intervention and further discussion on the costs and benefits associated with the Chicago CPC program see Reynolds et al. (2002; 2009).

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I. Discounting Future Benefits and Costs

The net present value (NPV) of benefits minus costs as of program entry at age 3 is calculated using the following formula for real inflation-adjusted benefits (B) and costs (C) at time (t). To adjust for inflation, estimates are converted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers (CPI-U). Benefits and costs are discounted by the real annual discount rate (r), assumed to be 3%. Certain benefits (e.g., lifetime earnings and tax contributions) are projected through age 65 which is equivalent to $t = 62$ ($t = 0$ at age 3). Appendix D shows estimated benefits and costs for the preschool, school-age, and extended interventions using annual discount rates between 0% and 20%.

$$NPV = \sum_{t=0}^{62} \frac{B_t}{(1+r)^t} - \sum_{t=0}^{62} \frac{C_t}{(1+r)^t}$$

II. Estimating the Cost of the Chicago CPC Program

The number of years of program participation varied across students. Students were able to enroll in one or two years of the preschool intervention and one, two or three years of the school-age intervention from grades 1 through 3. In 2007 dollars, the cost for one year of the preschool intervention in 1986 was $5,597 per student. The undiscounted cost for one year of the school-age intervention was $2,010 in 2007 dollars. Students could have up to two years of preschool and up to three years of school-age intervention.

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TABLE 1

Itemized Costs of the Chicago Child-Parent Centers Program (2007 Dollars)

Budget Category	Preschool Program		School-Age Program
Instructional staff	10,003,584		9,985,306
Family and school-community staff/parent program	2,219,634		32,607
Administration	2,910,615		1,884,416
Operations and maintenance	2,423,626		-
Instructional materials	179,067		149,618
Capital outlays and equipment	96,770		151,199
Transportation, food, and community services	108,586		54,438
School-wide services	992,063		-
School district support	180,161		179,032
Parent program participation	1,808,448		1,141,399
Capital depreciation and interest	2,101,559		-
Total cost in 2007 dollars	23,024,113		13,578,015
Number of children in 25 centers/schools	4,114		6,757
Average cost per child for one year	5,597		2,010
Present value of weighted average cost per child	8,512		3,792
Present value of weighted average cost per child for 4 to 6 years of CPC participation	-	12,719	-
Amount above and beyond participation for 1 to 4 years of intervention	-	5,163	-

Note: Original program costs (nominal dollars) for the preschool program are for 1985-1986. Costs for the school-age program are for 1986-1987. Costs were converted to 2007 dollars using the Consumer Price Index for All Urban Consumers (CPI-U). The 1986, 1987, and 2007 CPI-U values are, 109.6, 113.6, and 207.342, respectively. The present value is evaluated at age 3 using a real annual discount rate of 3%. Parent program costs are based on 10 hours of participation per month at a minimum wage of $3.35 in 1986 dollars. The present value of the weighted average cost of 1 to 4 years of intervention (less-extensive participation) is $7,556 in 2007 dollars.

II A. The cost of the preschool program

In calculating the present value cost of the preschool program, 100% of the preschool participants had one year of preschool and 55% had two years. Assuming that the students with only one year of preschool intervention entered the program in 1984 (age 4) rather than 1983 (age 3), the present value of the average cost of the preschool program per participant is:

$$(.55)(\$5,597) + (1.00)(\$5,597/1.03) = \$8,512.$$

II B. The cost of the school-age program

In calculating the present value cost of the school-age program, 100% of the students in that intervention group had one year of the school-age program, 80.4% of the students had a second year, and 29.8% were enrolled in the third year of the program. The present value of the average cost of the school-age program (1 to 3 years of school-age services) is:

$$(1.00)(\$2,010/1.03^3) + (.804)(\$2,010/1.03^4) + (.298)(\$2,010/1.03^5) = \$3,792.$$

The present value of the average cost for 2 to 3 years of school-age services is:

$$(1.00)(\$2,010/1.03^3) + (1.00)(\$2,010/1.03^4) + (.370)(\$2,010/1.03^5) = \$4,266.$$

II C. The cost of the extended program

Students who participated in the extended program had 4-6 years of intervention services. In calculating the present value cost of the extended program, 100% of the program participants had at least one year of preschool and 55.7% had two years. All of the extended program participants had at least two years of the school-age intervention (in first and second grade) while 31.3% had a third year. With an annual cost of $5,597 in 2007 dollars for the preschool program and $2,010 for a year of the school-age program, the present value of the average cost of the extended program is:

$$(.557)(\$5,597) + (1.00)(\$5,597/1.03) + (1.00)(\$2,010/1.03^3) + (1.00)(\$2,010/1.03^4) + (.313)(\$2,010/1.03^5) = \$12,719.$$

The present value of the average cost for students that received 5-6 years of intervention services (one or two years of CPC preschool and three years of school-age services is:

$$(.490)(\$5,597) + (1.00)(\$5,597/1.03) + (1.00)(\$2,010/1.03^3) + (1.00)(\$2,010/1.03^4) + (1.00)(\$2,010/1.03^5) = \$13,535.$$

II D. The cost of the less-extended program

Students who experienced the less-extended intervention received at least one year of intervention (either in preschool or school-age) but fewer than 5 years of intervention. There are a variety of combinations of intervention experiences for students in this group. For example, 50.7% of these students received one or two years of preschool but did not participate in the school-age program. Approximately 27.6% received zero years of preschool but 1 to 3 years of the school-age program. The frequencies of the various combinations of 1 through 4 years of intervention are presented in table 2.

TABLE 2

Rates of Participation for Various Combinations of Intervention

Years of Intervention	Preschool 0 years	Preschool 1 year	Preschool 2 years	Total
School-age 0 years	0%	24.3%	26.4%	50.7%
School-age 1 year	6.3	10.6	10.8	27.7
School-age 2 years	8.0	0.0	0.3	8.3
School-age 3 years	13.3	0.0	0.0	13.3
Total	27.6	34.9	37.5	100.0

Employing the various participation rates, the present value of the average cost of the less-extended program is:

$$(.375)(\$5,597) + (.349+.375)(\$5,597)/1.03 + (.277+.083+.133)(\$2,010/1.03^3)$$
$$(.083+.133)(\$2,010/1.03^4) + (.133)(\$2,010/1.03^5) = \$7,556.$$

The cost of the extended program (4 to 6 years of CPC intervention), above and beyond less extensive participation (1 to 3 years of CPC intervention) is equal to the present value average cost of the extended program minus the present value average cost of the less-extended program. The marginal cost of the extended program (4 to 6 years of intervention) is:

$$\$12,719 – \$7,556 = \$5,163.$$

The present value of the average cost for students that received 5-6 years of intervention services (one or two years of CPC preschool and three years of school-age services is, above the present value of the average cost for 1 to 3 years of CPC intervention is:

$$\$13,535 - \$7,556 = \$5,979.$$

III. Estimating Economic Returns Attributed to the Chicago CPC Program

The age 26 cost-benefit analysis of the CPC program features the following benefits: (A) reduced private expenditures for child care services, (B) reduced public expenditures for school remedial services (i.e., retention and special education), (C) reduced criminal justice system expenditures for juvenile and adult criminal behavior, (D) averted tangible and intangible juvenile and adult criminal victimization costs, (E) reduced child welfare system and abuse and neglect victimization costs (tangible and intangible), (F) increased lifetime earnings and compensation realized by program participants and associated government tax revenues, (G) increased private and public expenditures for post-secondary education (college or university), and (H) reduced costs associated with adult depression, (I) substance misuse, and (J) daily tobacco use. Monetary benefits and costs attributed to the CPC program are estimated by multiplying the predicted program effect (Table 3; Reynolds, et al., in press) by the relevant present value cost or benefit (Appendix B; Reynolds et al., 2009). Also see Appendix A of this document.

III A. Reduced expenditures for child care services

The estimate for child care services is calculated assuming an average of 540 hours per year over 1.5 years, assuming that the value of parents' time is equal to the minimum wage of $3.35 per hour in 1986 (adjusted for inflation). In estimating the reduction in expenditures for child care services, the proportion of comparison group participants that attended an alternative preschool program (e.g. Head Start) is accounted for, thus, the estimates presented below represent marginal benefits. In evaluating the childcare effect associated with the extended intervention, three children were removed from the intervention group and placed in the comparison group because they were no longer able participate in the CPC intervention. Of the three children removed from the program group, one student had one year of the CPC preschool intervention and two students had two years of the CPC preschool intervention.

TABLE 3
Preschool Participation for Assessing the Childcare Savings from the Preschool Intervention

Preschool Participation	CPC Program Group	Comparison Group
Original sample size	989	550
Number of cases 1 year (%)	455	37
Number of cases 2 years (%)	534	47

TABLE 4
Preschool Participation for Assessing the Childcare Savings from the Extended Intervention

Preschool Participation	CPC Extended Program Group (4-6 years of CPC)	Extended Comparison Group (1-3 years of CPC)
Adjusted sample size	553	602
Number of cases 0 years	0	162
Number of cases 1 year	244	211
Number of cases 2 years	309	229

Child care services

Estimated benefit of the preschool program
> Preschool participation, % 1 year (Program = 1.00, Comparison = .153, diff. = .847)
> Preschool participation, % 2 years (Program = .540, Comparison = .085, diff. = .455)

The present value of reduced private expenditures for child care services attributed to the preschool program is:

$$((.455)(540)(\$6.36)) + ((.847)(540)(\$6.36/1.03)) = \$4,387.$$

Estimated benefit of the school-age program
The effect of the school-age program is assessed by comparing students who participated in the school-age program for one or more years to those who did not attend the school-age program regardless of their preschool experience. Because all CLS participants (program and comparison group participants) were eligible for participation in a full-day kindergarten program, the present value of reduced expenditures for child care services attributed to the school-age program is $0.

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Estimated benefit of the extended program

      Preschool participation, % 1 year (Program =1.00, Comparison = .731, diff. = .269)
      Preschool participation, % 2 years (Program = .559, Comparison = .380, diff. = .179)

The present value of reduced private expenditures for child care services attributed to the extended program is:

$((.179)(540)(\$6.36)) + ((.269)(540)(\$6.36/1.03)) = \$1,512.$

III B. Reduced expenditures for school remedial services

Following the age 21 cost-benefit analysis of the CPC program, the estimate for school remedial services reported in the age 26 analysis accounts for grade retention by age 15 and special education placement from ages 6 to 18.

<u>Grade retention</u>

Grade retention is assumed to increase the public cost to facilitate completion of a particular level of schooling for a student. It is assumed that retaining a student for one year doubles the cost associated with facilitating the completion of a particular grade. For example, if a student is retained in grade three, and, thus, is required to repeat grade three, the public costs to enable the student to complete grade three is expected to be twice the annual per pupil cost to facilitate completion of grade three. The estimated cost of retention employed in the age 26 analysis ($9,173, in 2007 dollars) is the undiscounted average per pupil annual expenditure in Chicago for general education (Illinois State Board of Education, 1997). Reynolds et al. (2002; 2009) assume that retention ultimately results in an additional year of schooling at age 19, and discount the average per pupil expenditure for general education to age 3. However, as discussed, the direct cost associated with retention is expected to be realized during the year in which the student is retained. Furthermore, because retention in the CLS sample is measured by age 15, and, thus, retained students presumably repeated required grades by age 16, discounting from age 19 to age 3 is believed to result in a conservative estimate.

Assuming that retention results in an addition year of schooling at age of 19, the present value of expenditures associated with being retained for one year is:

$\$9,173 /1.03^{16} = \$5,716.$

Estimated benefit of the preschool program
        Retained for one or more years by age 15
        (Program = .230, Comparison = .384, diff. = .154, $p <.001$, N = 1281)

The present value of reduced expenditures for grade retention attributed to the preschool program is:

$(.154)(\$5,716) = \$880.$

Estimated benefit of the school-age program
        Retained for one or more years by age 15
        (Program = .238, Comparison = .343, diff. = .105, $p = .001$, N = 1281)

The present value of reduced expenditures for grade retention attributed to the school-age program is:

$(.105)(\$5,716) = \$600.$

Estimated benefit of the extended program
        Retained for one or more years by age 15
        (Program = .219, Comparison = .323, diff. = .104, $p = .001$, N = 971)

The present value of reduced expenditures for grade retention attributed to the extended program is:

$(.104)(\$5,716) = \$594.$

Special education

The estimate for special education services ($9,910, in 2007 dollars) is the weighted average annual cost per pupil reported by the Chicago Public Schools for specific learning disabilities, emotional or behavioral disturbances, speech and language impairments, and mental retardation (Chicago Public Schools, 1995).

Assuming that special education placements occur at an average age of 12, the present value of expenditures for special education services is:

$\$9,910/1.03^{9} = \$7,596.$

Estimated benefit of the preschool program
>Number of years of special education from ages 6 to 18
>(Program = .73, Comparison = 1.43, diff. = .70, *p* = .06, N = 1281)

The present value of reduced expenditures for special education services attributed to the preschool program is:

(.70)($7,596) = $5,317.

Estimated benefit of the school-age program
>Number of years of special education from ages 6 to 18
>(Program = .76, Comparison = 1.24, diff. = .48, *p* = .08, N = 1281)

The present value of reduced expenditures for special education services attributed to the school-age program is:

(.48)($7,596) = $3,646.

Estimated benefit of the extended program
>Number of years of special education from ages 6 to 18
>(Program = .56, Comparison = 1.23, diff. = .67, *p* = .080, N = 971)

The present value of reduced expenditures for special education services attributed to the extended program is:

(.67)($7,596) = $5,089.

III C. Reduced criminal justice system expenditures

The estimate for reduced criminal justice system (CJS) expenditures accounts for reductions in the number of incidences of juvenile delinquency (ages 10-18) and adult criminal behavior (ages 19-44).

CJS expenditure for juvenile delinquency

Estimated juvenile CJS expenditures are based on per person annual costs for juvenile institutions from the Illinois Department of Corrections (IDOC) and include administrative costs associated with juvenile arrests. A national rate of adjudication for juvenile arrests of 58% is employed (Stahl et al., 1999). 19% of juvenile arrests are assumed to result in residential treatment and 39% are assumed to result in community treatment or probation services. The remaining 42% of juvenile arrests are assumed to result in release (Bureau of Justice Statistics, 1997; Cohen, 1988; Illinois Department of Corrections, 1999). In 2007 dollars, the cost for juvenile residential treatment is assumed to be $41,007 (Illinois Department of Corrections, 1999), and the annual per person costs for community treatment and probation services are $22,450 and $8,926, respectively. CJS costs per case for trail and processing are assumed to be $5,739 and $2,760 ($1,865 in adjudication costs and $895 in police costs), respectively

(Greenwood et al., 1994, Table 3.1). Based on the above values, weighted annual per person criminal justice system expenditures, including administrative costs for trail and processing, associated with a juvenile court petition are estimated to be $24,105, in undiscounted 2007 dollars.

> *Residential treatment:* $5,739 + $2,760 + $41,007 + $8,926 = $58,432
> *Community treatment and probation:* $5,739 + $2,760 + .50($22,450 + $8,926) = $24,187
> *Release:* $5,739 + $2,760 = $8,499
>
> *Weighted annual expenditure per case*: .19($58,432) + .39($24,187) + .42($8,499) = $24,105

Assuming the average juvenile offense in the CLS sample occurred at age 14 years, the present value of CJS expenditures for juvenile delinquency is:

$24,105/1.03^{11} = $17,414$.

Estimated benefit of the preschool program
Number of petitions to juvenile court by age 18
(Program = .45, Comparison = .78, diff. = .33, $p = .02$, N = 1404)

The present value of averted CJS expenditures for juvenile delinquency attributed to the preschool program is:

(.33)($17,414) = $5,747.

Estimated benefit of the school-age program
Number of petitions to juvenile court by age 18
(Program = 19.8, Comparison = 19.8, diff. = 0.00 $p = .99$, N = 1404)

The present value of averted CJS expenditures for juvenile delinquency attributed to the school-age program is:

(.00)($17,414) = $0.

Estimated benefit of the extended program
Number of arrest by age 18
(Program = .48, Comparison = .62, diff. = .14, $p = .320$, N = 1067)

The present value of averted CJS expenditures for juvenile delinquency attributed to the extended program is:

(.14)($17,414) = $2,438.

CJS expenditures for adult criminal behavior

CJS expenditures associated with adult criminal behavior are based on the estimated cost of an adult criminal career. Assuming a10% annual decrease in the adult crime rate from ages 19 to 44 and an annual discount rate of 4%, Greenwood et al. (1996, Table B.15) estimate that the average discounted present value CJS cost of an adult criminal career (ages 19 to 44) evaluated at age 19 is $27,350 in 1993 dollars, which is equal to approximately $39,244 in 2007 dollars. Because costs and benefits associated with the CPC program are evaluated at age 3, assuming a 3% annual discount rate, the estimate reported by Greenwood et al. (1996) is adjusted for use in the age 26 analysis of the CPC program. First, the estimated CJS cost of an adult criminal career reported by Greenwood et al. (1996) is treated as the present value of an annuity, where the discount rate (i) is equal to 4% and the number of periods (n) is equal to 25 (age 19 to 44). Second, the value of the annuity (A) is solved for using the following equation:

$$PV_A = A\left[\frac{1}{1+i}\right]^1 + A\left[\frac{1}{1+i}\right]^2 + ...A\left[\frac{1}{1+i}\right]^n = A\left[\frac{1-\frac{1}{(1+i)^n}}{i}\right]$$

$$\Rightarrow \$39,244 = A\left[\frac{1-\frac{1}{(1+.04)^{25}}}{.04}\right] = A(15.622)$$

$$\Rightarrow A = \frac{\$39,244}{15.622} \approx \$2,512$$

The estimate of approximately $2,512 is assumed to be the annualized undiscounted CJS cost of an adult criminal career, in 2007 dollars. That is, $2,512 is assumed to be the annual CJS cost associated with an adult criminal career. Total undiscounted CJS cost of an adult criminal career from ages 19 to 44 (a total of 25 years) are estimated to be approximately $62,803. Finally, annual CJS costs of $2,512 from age 19 to 44 are discounted to age 3 using a real annual discount rate of 3%. The resulting estimated present value CJS cost of an adult criminal career evaluated at age 3 is $28,077, in 2007 dollars. Because the cost of an adult criminal career is annualized, costs incurred at the start of an adult criminal career are likely underestimated. However, because criminal behavior generally decreases with age, the CJS cost incurred near the end of an adult criminal career are likely overestimated. Assuming the difference between actual CJS costs and estimated or annualized CJS costs is largest at the start of an adult criminal career, the estimate reported above is believed to be conservative.

Estimated benefit of the preschool program
>   Number of adult felony arrest by age 26
>   (Program = .32, Comparison = .44, diff. = .118, *p* =.02, N = 1473)

The present value of averted CJS expenditures for adult criminal behavior attributed to the preschool program is:

(.118)($28,077) = $3,313.

Previous analyses suggest that the school-age and extended interventions are not associated with measures of adult criminal behavior (e.g., arrest, conviction, incarceration). Therefore, the present value of savings in CJS expenditures for adult criminal behavior attributed to the school-age and extended interventions is assumed to be $0.

III D. Reductions in tangible and intangible criminal victimization costs

The estimates for averted tangible victim costs associated with juvenile and adult criminal behavior are based on national estimates of the amount and proportion of tangible losses to crime victims for violent and property offenses (Barnett, 1996; Karoly et al., 1998; Miller, Cohen, & Wiersema, 1996). It is assumed that criminal victimization costs are 4.5 times CJS expenditures. Tangible and intangible victimization costs are assumed to represent 23.3% and 76.7% of total estimated victim costs, respectively. The national estimates are applied to the estimated juvenile and adult CJS expenditures in section III C of this document. To determine the value of averted victimization costs associated with juvenile crime the estimated program effect on the adjusted mean number of juvenile arrests for violent and property offences is multiplied by the estimated present value of tangible juvenile crime victim costs. Averted tangible and intangible costs associated with adult criminal victimization are estimated from the estimated program effect on the mean number of adult felony arrests by age 26.

Victimization expenditures associated with juvenile crime

The estimate of tangible and intangible juvenile criminal victimization costs are:

(4.5)(.233)($24,105) = $25,274 and (4.5)(.767)($24,105) = $83,198, respectively .

Assuming that juvenile arrests occur at an average age of 14, the present value of tangible and intangible juvenile criminal victimization costs are:

$25,274/1.03^{11} = $18,258 and $83,198/1.03^{11} = $60,104, respectively.

Estimated benefit of the preschool program
        Effect on the mean number of juvenile arrest for violent and property offenses = .236

The present values of averted tangible and intangible juvenile criminal victimization costs attributed to the preschool program are:

(.236)($18,258) = $4,309 and (.236)($60,104) = $14,185, respectively.

Estimated benefit of the school-age program
        Effect on the mean number of juvenile arrest for violent and property offenses = .019

The present values of averted tangible and intangible juvenile criminal victimization costs attributed to the school-age program are:

(.019)($18,258) = $347 and (.019)($60,104) = $1,142, respectively.

Estimated benefit of the extended program
        Effect on the mean number of juvenile arrest for violent and property offenses = .165

The present values of averted tangible and intangible juvenile criminal victimization costs attributed to the extended program are:

(.165)($18,258) = $3,013 and (.165)($60,104) = $9,917, respectively.

Victimization expenditures associated with adult crime

The estimate of tangible and intangible adult criminal victimization costs are:

(4.5)(.233)($62,803) = $65,849 and (4.5)(.767)($62,803) = $216,763, respectively.

The present value of tangible and intangible adult criminal victimization costs are:

(4.5)(.233)($28,077) = $29,439 and (4.5)(.767)($28,077) = $96,909 , respectively.

Estimated benefit of the preschool program
        Number of adult felony arrest by age 26
        (Program = .32, Comparison = .44, diff. = .118, p =.02, N = 1473)

The present values of averted tangible and intangible adult criminal victimization costs attributed to the preschool program are:

(.118)($29,439) = $3,474 and (.118)($96,909) = $11,435, respectively.

As discussed above, previous analyses suggest that the CPC school-age and extended programs did not have a significant effect on adult criminal behavior. Therefore, averted tangible and intangible adult criminal victimization costs attributed to both the school-age and extended interventions are assumed to be $0.

III E. Reduced child welfare system expenditures and abuse and neglect victimization costs
The measure used to indicate child maltreatment is court referrals by the Department of Child and Family Services or other organizations between the ages of 4 and 17 years. Court referrals represent substantiated reports of child abuse or neglect and generally only account for one third of all reports of maltreatment to child welfare agencies (U.S. Department of Health & Human Services, 1997).

Child welfare system expenditures

The estimate for child welfare expenditures assumes that 70% of substantiated reports of child abuse and neglect result in in-home services, while the remaining 30% of cases result in out-of-home care. In 2007 dollars, the undiscounted annual costs for in-home services, including homemaker assistance and family counseling, is estimated to be $3,676 (American Humane Association, 1994; Courtney, 1998; Larner, Stevenson, & Behrman, 1998). For the age 26 analysis of the CPC program, the cost per case to provide out-of-home care is based on the weighted average daily expenditure rate for out-of-home placement in Illinois in 2006. Data on out-of-home placements and average daily expenditure rates for placements in Illinois in 2006 were provided by the Illinois Department of Child and Family Services (IDCFS). The IDCFS categorizes placements into relative foster care, non-relative and specialized foster care, institutional care, group home care, and independent and transitional living programs.

Information on program and comparison group participants placed in out-of-home care between ages 4 to 17 years and the average duration of placement by placement type are used to estimate the weighted average cost of out-of-home care in Illinois. On average, program and comparison group participants with a history of out-of-home placement received services for approximately four years. Some participants were placed in multiple settings over the relevant period. The average case received relative foster care for approximately 50% of the total duration of services.

In addition to the categories of care defined in the documentation provided by the IDCFS, daily rates are estimated for pre-adoptive homes and placements that were recorded as other. The daily rate for pre-adoptive homes is assumed to be equal to the weighted average daily rate for relative and non-relative foster care. The daily rate for other placements is assumed to be equal to the weighted average daily rate for the placement categories reported by the IDCFS. The highest rates are for institutional care and group home placements, respectively. In 2007 dollars, the undiscounted weighted average cost associated with out-of-home placement services for an average of approximately four years is estimated to be $150,415. See Appendix C of this document for additional information related to the estimation of expenditures for out-of-home services.

Adding investigation expenditures of $1,107 and administrative costs of $1,865 for judicial processing associated with referrals (American Humane Association, 1994; Courtney, 1998; Larner, Stevenson, & Behrman, 1998), the estimate for child welfare system expenditures in undiscounted 2007 dollars is:

$$(.70)(\$3,676) + (.30)(\$150,415) + (\$1,107) + (\$1,865) = \$50,669.$$

Assuming that referrals occur at an average age of 10, the present value of average child welfare system expenditures for abuse and neglect is:

$$\$50,669/1.03^7 = \$41,199.$$

Estimated benefit of the preschool program
        Substantiated reports of abuse/neglect from ages 4 to 17
        (Program = .099, Comparison = .174, diff. = .075, $p <. 001$, N = 1411)

The present value of reduced child welfare system expenditures for abuse and neglect attributed to the preschool program is:

$$(.075)(\$41,199) = \$3,090.$$

Estimated benefit of the school-age program
        Substantiated reports of abuse/neglect from ages 4 to 17
        (Program = .120, Comparison = .133, diff. = .013, $p = .53$, N = 1411)

The present value of reduced child welfare system expenditures for abuse and neglect attributed to the school-age program is:

$$(.013)(\$41,199) = \$536.$$

Estimated benefit of the extended program
        Substantiated reports of abuse/neglect from ages 4 to 17
        (Program = .084, Comparison = .144, diff. = .060, $p = .004$, N = 1061)

The present value of reduced child welfare system expenditures for abuse and neglect attributed to the extended program is:

$$(.060)(\$41,199) = \$2,472.$$

Expenditures associated with abuse/neglect victimization

Child abuse and neglect victim costs ($8,797, in undiscounted 2007 dollars) are based on the tangible losses associated with child abuse and neglect, as estimated by the National Institute of Justice (Miller, Cohen, & Wiersema, 1996). The estimate includes medical care/Ambulance services, mental health care, police/fire services, and lost productivity of victims and their

families, with respective average costs of $621 ($617 + $4), $4,893 ($3,587 + $1,306), $44 ($41 + $3) , and $3,193 ($3,157 + $36), in undiscounted 2007 dollars. In addition, the estimate includes administrative costs equal to 7.5% of medical care/Ambulance services costs (Miller et al., 1996). Average intangible victim costs associated with abuse/neglect (i.e., reduced quality of life) are estimated to be $86,482, in undiscounted 2007 dollars (Miller et al., 1996).

The estimate of tangible child abuse and neglect victimization costs is:

($621) + (.075)($621) + ($4,893) + ($44) + ($3,193) = $8,797.

Assuming that court referrals occur at an average age of 10, the net present value of average tangible costs associated with child abuse and neglect victimization evaluated at age 3 is:

$8,797/1.03^7 = $7,153.

The estimate of intangible child abuse and neglect victimization costs is:

($75,146) + ($11,336) = $86,482.

Assuming that quality of life reductions related to abuse and neglect victimization occur between ages 4 and 44 (a period of 41 years), the average undiscounted annualized intangible cost associated with abuse and neglect victimization is:

$86,482/41 = $2,109.

Evaluated at age 3, the present value of intangible abuse and neglect victimization costs from ages 4 through 44 is approximately $49,384.

Estimated benefit of the preschool program
> Substantiated reports of abuse/neglect from ages 4 to 17
> (Program = .099, Comparison = .174, diff. = .075, $p <. 001$, N = 1411)

The present values of averted tangible and intangible costs associated with abuse and neglect victimization attributed to the preschool program are:

(.075)($7,153) = $536 and (.075)($49,384) = $3,704, respectively.

Estimated benefit of the school-age program
> Substantiated reports of abuse/neglect from ages 4 to 17
> (Program = .120, Comparison = .133, diff. = .013, $p = .53$, N = 1411)

The present values of averted tangible and intangible costs associated with abuse and neglect victimization attributed to the school-age program are:

(.013)($7,153) = $93 and (.013)($49,384) = $642, respectively.

Estimated benefit of the extended program
> Substantiated reports of abuse/neglect from ages 4 to 17
> (Program = .084, Comparison = .144, diff. = .060, p = .004, N = 1061)

The present values of averted tangible and intangible costs associated with abuse and neglect victimization attributed to the extended program are:

 (.060)($7,153) = $429 and (.060)($49,384) = $2,963, respectively.

III F. Increased earnings and compensation of program participants and associated increase in income tax revenues

Increases in lifetime earnings and compensation are projected from the difference in the high school completion rate between the program and comparison group, where high school completion is defined as graduating from a regular high school or earning an equivalent diploma (e.g., GED). Using 1999 data from the 2000 Current Population Survey (CPS) March Supplement for African American full-time employees aged 25-29 (U.S. Census Bureau, 2000), lifetime earnings are projected across four categories of educational attainment (less than high school, high school completion, some college, and 4 years of college or more). Estimates are derived for both males and females. The annual earnings data reported in table 5 represent weighted averages for those with less than a high school education (where the original CPS categories "less than 9th grade" and "9th to 12th grade" are combined) and for those with some college (where the CPS categories "some college - no degree" and "associate degree" are combined). Although more recent CPS data is available, to be consistent with the age 21 cost-benefit analysis of the CPC program conducted by Reynolds et al. (2002), 1999 data from the 2000 CPS March Supplement is employed in the age 26 analysis.

There are different methods of predicting lifetime earnings given data on educational attainment and earnings in a particular year. For example, Barnett (1996) employs similar cross-sectional data on educational attainment and earnings for African Americans of different ages to generate information on the lifetime pattern of earnings for a particular individual. One might argue, however, that the current earnings of a 60 year old individual are not an accurate predictor of the future earnings of an individual who is currently a young adult. Certainly, the career opportunities available to young African Americans are different from the opportunities faced by members of older generations.

In the age 26 cost-benefit analysis of the CPC program an alternative method of projecting lifetime earnings is employed. Rather than using information on the current earnings of individuals of different ages, only the earnings of the age 25-29 cohort are used. Annual earnings by educational attainment for this age group are used to project the lifetime earnings of CLS participants with differing levels of educational attainment because these individuals were close in age to the CLS program and comparison group participants, and, thus, are assumed to face similar career opportunities, and were old enough so that many of them had completed their educations.

Alternative methods using educational attainment and average earnings of African Americans employed full-time or part-time from the age 25-29 CPS cohort, educational attainment and earnings for African Americans from consecutive age cohorts, and educational attainment and earnings of African Americans from later survey years are used to test the robustness of the method employed in the age 26 cost-benefit analysis of the CPC program. Bases on this investigation, the selected method is believed to results in a conservative estimate of the earnings benefit associated with the CPC program.

The increase in lifetime earnings and compensation associated with high school completion is computed employing the following assumptions:

1. 1999 earnings are converted to 2007 dollars using the Consumer Price Index for All Urban Consumers.

2. Because the earnings of individuals aged 25-29 represent not only their educational attainment but the return to experience, these earnings are discounted by a real rate of 2% a year in order to represent the earnings of the students in the sample at the time they entered the workforce. For dropouts assumed to be entering the workforce at age 17, the earnings of the 25-29 cohort are discounted by 2% a year for 10 years (age 27 to age 17). For high school graduates and GED completers, the earnings of the age 25-29 cohort are discounted back 9 years (age 27 to age 18). For those with some college, the age 25-29 cohort earnings are discounted back 7 years (age 27 to age 20) and for those with 4 years of college or more, the 25-29 cohort earnings are discounted back 4 years (age 27 to age 23). That is, the earnings of the 25-29 cohort are multiplied by $1/(1+r)^t$, where (r) is 0.02 and (t) is 10, 9, 7, or 4. The multiplication factor is equal to approximately 0.8203, 0.8368, 0.8706, and 0.9238 for dropouts, high school graduates, those with some college, and those with 4 years of college or more, respectively. The adjusted earnings figures in table 5 represent annual earnings in 1999 converted to 2007 dollars and are discounted for years of experience, assumed to be inherent in the age 27 data.

3. Students with less than a high school education are assumed to have started work at age 17. Students with some college education are assumed to have graduated from high school on time and then completed two years of college. Students with 4 years of college or more are assumed to have spent five years in college. Students are assumed to have worked part time in college earning one-fourth of a high school graduate's earnings with no fringe benefits.

4. The present values of earnings from each of the four different levels of educational attainment are calculated assuming that individuals work continuously through age 65.

5. Income taxes are assumed to be 33.3% (15% Federal, 3% State, and 15.3% FICA). Employers and employees are assumed to each pay 50% of FICA, which is equal to 7.65% FICA.

6. Fringe benefits are assumed to be 43.5% of wage and salary earnings, as suggested by the U.S. Bureau of Labor Statistics (2009, Table 11). In 2008, average wage and salary earnings for all full-time workers employed in private industry equaled $21.64 per hour. In the same year average benefits including paid leave, supplemental pay, insurance, and retirement and other employer contributions (e.g., Social Security and Medicare) equaled $9.43.

7. Earnings are assumed to grow at a real rate of 2% per year.

8. Accounting for the growth of earnings, annual after-tax earnings plus fringe benefits are discounted to age 3 using a real annual discount rate of 3%.

TABLE 5

Unadjusted and Adjusted Mean Annual Earnings by Educational Attainment for African Americans Employed Full-time Year-round (2000 CPS, 2007 Dollars)

Education Category	Male	Male (adj.)	Female	Female (adj.)
Less than high school	$20,488	$16,807	$18,483	$15,162
HS graduate including GED	33,526	28,053	25,391	21,246
Some college	35,661	31,045	29,470	25,656
Bachelor degree or more	51,599	47,670	40,150	37,093

TABLE 6

Projected Present Value of Lifetime Earnings and Taxes by Educational Attainment for African American Males and Females Employed Full-time Year-round (2000 CPS, 2007 Dollars)

Education Category	Earnings and Compensation	Taxes
Less than high school	$487,463	$137,739
HS graduate including GED	718,142	202,920
Some college	758,719	215,353
Bachelor degree or more	990,369	282,225

Note: Estimates are evaluated at age 3 assuming a 3% real annual discount rate, a 2% real annual growth in wage and salary earnings, a 43.5% fringe benefit rate, and a 33% tax rate. Earnings and compensation are after taxes.

TABLE 6a – Females

Projected Present Value of Lifetime Earnings and Taxes by Educational Attainment for African American Females Employed Full-time Year-round (2000 CPS, 2007 Dollars)

Education Category	Earnings and Compensation	Taxes
Less than high school	$462,382	$130,652
HS graduate including GED	618,991	174,904
Some college	686,350	194,771
Bachelor degree or more	866,598	246,923

Note: Estimates are evaluated at age 3 assuming a 3% real annual discount rate, a 2% real annual growth in wage and salary earnings, a 43.5% fringe benefit rate, and a 33% tax rate. Earnings and compensation are after taxes.

TABLE 6b – Males

Projected Present Value of Lifetime Earnings and Taxes by Educational Attainment for African American Males Employed Full-time Year-round (2000 CPS, 2007 Dollars)

Education Category	Earnings and Compensation	Taxes
Less than high school	$512,544	$144,826
HS graduate including GED	817,292	230,936
Some college	831,088	235,936
Bachelor degree or more	1,114,140	317,528

Note: Estimates are evaluated at age 3 assuming a 3% real annual discount rate, a 2% real annual growth in wage and salary earnings, a 43.5% fringe benefit rate, and a 33% tax rate. Earnings and compensation are after taxes.

Lifetime earnings and compensation

Projected lifetime earnings for high school dropouts are compared to the weighted average lifetime earnings for those with a regular high school diploma or GED, some college, and a 4 year degree or more. The category some college includes CLS participants with some college but no degree, an associate degree, or a certificate (vocational or other). By August 2005 48.7%, 44.8%, and 6.5% of the 1,035 CLS study participants with at least a high school diploma or equivalent had completed high school, completed some college, and completed a 4 year degree or more, respectively. The weights are presented in table 8 and are adjusted to account for expected changes in the educational attainment of CLS participants. Based on educational attainment trends in the CLS data set and the number of study participants currently pursuing a bachelor degree, a nontrivial number of program and comparison group participants are expected to complete a bachelor degree in the future. In addition, a percentage of recent high school completers in the CLS educational attainment sample are expected to receive some post-secondary training. It is assumed that the proportion of individuals with some college (some college but no degree, associate degree, or certificate) will increase by 5 percentage points. All CLS participants expected to attend college have completed high school by August 2005. In addition, it is assumed that the proportion of high school completers with a bachelor degree or more will increase by 3.5 percentage points. Of those CLS participants expected to complete a 4 year degree or more, it is assumed that 66.7% completed some college by August 2005 and the remaining 33.3% completed high school only by August 2005.

TABLE 7
Highest Level of Education Completed by August 2005(Program and Comparison Group)

Education Category	N	Percent
Less than high school	338	24.6
HS graduate including GED	504	36.7
Some college	464	33.8
Bachelor degree or more	67	4.9
Total	1,373	100.0

TABLE 8
Distribution of CLS Participants who Completed High School by August 2005

Education Category	N	Percent	Percent (adj.)
HS graduate including GED	504	48.7	42.5
Some college	464	44.8	47.5
Bachelor degree or more	67	6.5	10.0
Total	1,035	100.0	100.0

The estimated present value of the difference in lifetime earnings between African American high school dropouts and those who complete high school is:

[(.425)($718,142) + (.475)($758,719) + (.100)($990,369)] – ($487,463) ≈ $277,102.

Note: The above calculation is not exact due to rounding.

Estimated benefit of the preschool program
      High school completion by age 24
      (Program = .795, Comparison = .714, diff. = .081, *p* = .002, N = 1372)

The present value of the increase in lifetime earnings and compensation attributed to the preschool program is:

(.081)($277,102) = $22,445.

Estimated benefit of the school-age program
      High school completion by age 24
      (Program = .778, Comparison = .755, diff. = .023, *p* = .36, N = 1372)

The present value of the increase in earnings and compensation attributed to the school-age program is:

(.023)($277,102) = $6,373.

Estimated benefit of the extended program
      High school completion by age 24
      (Program = .807, Comparison = .768, diff. = .039, *p* = .15, N = 1035)

The present value of the increase in earnings and compensation attributed to the extended program is:

(.039)($277,102) = $10,807.

Government tax revenues

The estimated present value of the difference in taxes on lifetime earnings between African American high school dropouts and those who complete high school is:

[(.425)($202,920) + (.475)($215,353) + (.100)($282,225)] – ($137,739) ≈ $78,996.

Note: The above calculation is not exact due to rounding.

Estimated benefit of the preschool program
      High school completion by age 24
      (Program = .795, Comparison = .714, diff. = .081, *p* = .002, N = 1372)

The present value increase in income tax revenues attributed to the preschool program is:

(.081)($78,996) = $6,399.

Estimated benefit of the school-age program
>High school completion by age 24
>(Program = .778, Comparison = .755, diff. = .023, p = .36, N = 1372)

The present value increase in income tax revenues attributed to the school-age program is:

(.023)($78,996) = $1,817.

Estimated benefit of the extended program
>High school completion by age 24
>(Program = .807, Comparison = .768, diff. = .039, p = .15, N = 1035)

The present value increase in income tax revenues attributed to the extended program is:

(.039)($78,996) = $3,081.

III G. Increase in expenditures for post-secondary education
Estimated expenditures for college tuition ($12,047, in undiscounted 2007 dollars) are based on the average tuition and fees for two years at the three colleges in Illinois most frequently attended by CLS program and comparison group participants (Northern Illinois University, Southern Illinois University, and City Colleges of Chicago). In estimating the monetary value of the program effect associated with college attendance, the discounted present value cost for two years of college was multiplied by the difference in the proportion of individuals in the program and comparison groups who completed at least 0.5 credits at a 2 or 4 year institution by age 25.

2/3 of expenditures are allocated to taxpayers (public expenditures) and the remaining 1/3 are allocated to program participants and their families (private expenditures).

College tuition

Assuming that the average age of college entry is 18, the present value cost of attending college for two years is:

$12,047 /$1.03^{15}$ = $7,733.

Public and private expenditures are $5,155 and $2,578, respectively.

Estimated benefit of the preschool program
>Completed at least 0.5 credits at a 2 or 4 year institution by age 25
>(Program = .109, Comparison = .071, diff. = .038, p = .04, N = 1373)

The present value of the increase in expenditures for college tuition and fees attributed to the preschool program is:

(.038)($7,733) = $294.

Public and private expenditures for two years of college are $196 and $98, respectively.

Estimated benefit of the school-age program
    Completed at least 0.5 credits at a 2 or 4 year institution by age 25
    (Program = .101, Comparison =.084, diff. = .017, p =.32, N = 1373)

The present value of the increase in expenditures for college tuition and fees attributed to the school-age program is:

(.017)($7,733) = $132.

Public and private expenditures for two years of college are $88 and $44, respectively.

Estimated benefit of the extended program
    Completed at least 0.5 credits at a 2 or 4 year institution by age 25
    (Program = .129, Comparison = .100, diff. = .029, p = .14, N = 1036)

The present value of the increase in expenditures for college tuition and fees attributed to the extended program is:

(.029)($7,733) = $224.

Public and private expenditures for two years of college are $149 and $75, respectively.

III H. Savings from reduced indications of early adult depression
The estimated average cost of adult depression accounts for the direct cost of depression (i.e., in-patient care, out-patient care, and pharmaceuticals) and work place related costs (i.e., absenteeism and lost productivity). Assuming 18.1 million Americans were depressed in 2000, Greenberg et al. (2003) estimate that the total average annual costs of depression, excluding suicide related costs, is $9,411 ($3,984 in direct costs and $5,427 in work place costs), in undiscounted 2007 dollars. Since early adult depression data was collected from age 19 through 24, the average age of occurrence in the CLS sample is assumed to be 22. The estimate reported in the age 26 cost-benefit analysis of the CPC program assumes depression related costs are incurred for an average of two years, and, thus, does not account for the possibility that depressed individuals in the CLS sample receive services for more than two years over the age period 19 through 24. In addition, no attempt has been made to forecast the program effect on depressive symptoms and the associated costs beyond age 24.

The appropriateness of the estimate used in the age 26 analysis of the CPC program depends on the expected duration of depression and the probability of reoccurrence after treatment. Furthermore, work related costs are expected to be incurred for multiple years if the employee in question does not receive treatment, potentially resulting in significantly higher costs. In addition, although the estimated total cost of depression reported by Greenberg et al. (2003)

includes the cost of suicide, costs associated with suicide are not included in the age 26 analysis of the CPC program.

Assuming the average age at which CPC study participants indicated adult depression is 22, the present value of depression related costs for two years is:

$(\$18,821)/1.03^{19} = \$10,733$.

Estimated benefit of the preschool program
> Reported any depression symptom
> (Program = .128, Comparison = .174, diff. = .046, p = .06, N = 1134)

The present value of savings from reduced indications of early adult depression attributed to the preschool program is:

$(.046)(\$10,733) = \$494$.

Previous analyses suggest that the school-age program is not associated with reduced indications of early adult depression. Therefore, the present value of savings from reduced indications of early adult depression attributed to the school-age program is assumed to be \$0.

Estimated benefit of the extended program
> Reported any depression symptom
> (Program = .121, Comparison = .161, diff. = .040, p = .10, N = 858)

The present value of savings from reduced indications of early adult depression attributed to the extended program is:

$(.040)(\$10,733) = \$429$.

III I. Savings from reduced rates of substance misuse
The measure of substance misuse accounts for program and comparison group participants' reports of substance abuse treatment, substance abuse problems, and current use of marijuana or harder drugs at least a few times per week. In addition, the measure accounts for drug related criminal offenses identified through administrative records. The estimate of saving associated with reduced rates of substance misuse considers rehabilitation and treatment expenses, workplace productivity, medical costs associated with potential overdose and other drug related illnesses, risk of premature death, and the opportunity cost of resources associated with the manufacture and sale of drugs. The estimate is based on the undiscounted cost of drug use from ages 14 to 60 years, reported by Cohen (1998), and accounts for the probability that a current drug user will quit. To avoid double counting benefits criminal justice system costs and victim costs associated with drug related crimes, also reported by Cohen (1998), are excluded from the age 26 analysis of the CPC.

Cohen (1998) reports a range of values for each of the categories listed above. The sum of the lower bound estimates of drug related costs relevant for the age 26 analysis of the CPC program reported by Cohen (1998) ($212,639 in 2007 dollars) is divided equally over a 46 year period (age 14 to 60, the age range for Cohen's estimates). In undiscounted 2007dollars, the average annual cost of substance use is estimated to be $4,623. For the purpose of the age 26 analysis, costs occurring before age 16 or after age 44 are excluded. For the relevant 29 year period (age 16 through 44) the estimated undiscounted cost of drug use is approximately $134,055 ((29)($4,622.58)).

TABLE 9
Estimated Cost Associated with Drug Use by Category of Cost

Category of Cost	Undiscounted 2007 Dollars
Opportunity	$108,515
Treatment	13,177
Productivity loss	35,655
Medical	14,210
Premature death	41,081
Total	212,639
Annual average cost from age 14 to 60	4,623
Total cost from age 16 through 44	134,055

Source: Cohen, M. A. (1998).
Notes: Averages may not be exact due to rounding.

Assuming a 3% annual discount rate, the estimated present value of costs associated with substance misuse is $62,212.

Estimated benefit of the preschool program
      Substance misuse (include drug related offenses), ages 16 and older
      (Program = .143, Comparison = .188, diff. = .045, p = .04, N = 1473)

The present value of savings from reduced rates of substance misuse attributed to the preschool program is:

(.030)($62,212) = $2,800.

Previous analyses suggest that the school-age and extended programs are not associated with substance misuse. Therefore, the present value of savings from reduced rates of substance misuse attributed to the school-age and extended programs is assumed to be $0.

III J. Savings from reduced rates of daily tobacco use
Although not included in the primary cost-benefit analysis of the CPC program, estimated benefits associated with reduced rates of daily tobacco use are based on the present value mortality costs of smoking for males and females (Viscusi & Hersch 2007). In 2007 dollars, Viscusi & Hersch (2007) estimate the present value mortality costs of smoking for males and females to be $1,773,334 and $649,225, respectively (discounted to age 24 by an annual rate of

3%). The estimates are based on projected mortality costs per pack of cigarettes consumed. In 2007 dollars, the undiscounted costs are approximately $3 million (8,126 packs consumed after age 24 at $369 in mortality costs per pack) for males and $1.16 million (7,033 packs consumed after age 24 at $165 in mortality costs per pack) for females.

In 2007 dollars, the average present value mortality cost evaluated at age 3 is:

$$\$1,211,280/1.03^{21} = \$651,122.$$

The estimate excludes savings from reduced morbidity (illness) prior to death, typically associated with reduced rates of daily tobacco use. However, these costs are expected to be mitigated to some degree by higher costs associated with increased life expectancy, including medical expenditures for conditions typically occurring near the end of life (e.g., heart dieses, stroke, and Alzheimer's).

Estimated benefit of the preschool program
Daily tobacco use, age 22-24 (Program = .179, Comparison = .221, diff. = .042, $p = .13$, N = 1125)

CPC preschool participation was estimated to reduced the average rate of daily tobacco use by .042 percentage points (17.9% vs. 22.1%, $p =.13$). However, in addition to controlling for potential differences in experiences prior to preschool entry (e.g., race/ethnicity, gender, family and neighborhood poverty, child welfare history), the estimated effect of the CPC preschool program on daily tobacco use monetized for the purpose of the age 26 cost-benefit analysis controls for educational attainment and substance misuse in adulthood. The estimated effect (.023) was multiplied by the average present value mortality cost evaluated at age 3 ($651,122). The resulting benefit in terms of reduced smoking related mortality costs attributed to the CPC preschool program is:

$$(.027)(\$651,122) = \$14,976.$$

Previous analyses suggest that the school-age and extended programs are not associated with daily tobacco use. Therefore, the present value of savings from reduced rates of daily tobacco use attributed to the school-age and extended programs is assumed to be $0.

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Appendix A

Breakdown of Benefits and Costs for Estimating Economic Returns of the Chicago Child-Parent Centers by Age 26 (2007 dollars, 3% discount rate)

	Estimate in 2007 Dollars	Average Age of Benefit	Present Value at age 3	Preschool Effect	Preschool Benefit	School-age Effect	School-age Benefit	Extended Effect	Extended Benefit
Grade retention (ages 5-14)	$9,173	19	$5,716	0.154	$880	0.105	$600	0.104	$594
Special Education (ages 6-18)	9,910	12	7,596	0.7	5,317	0.48	3,646	0.67	5,089
Earnings (ages 18-65)	1,013,865	-	277,102	0.081	22,445	0.023	6,373	0.039	10,807
Tax contributions (ages 18-65)	273,704	-	78,996	0.081	6,399	0.023	1,817	0.039	3,081
Juvenile Crime (ages 10-18)									
CJS expenditures	24,105	14	17,414	0.33	5,747	-	0	0.14	2,438
Tangible victim costs	25,274	14	18,258	0.236	4,309	0.019	347	0.165	3,013
Intangible victim costs	83,198	14	60,104	0.236	14,185	0.019	1,142	0.165	9,917
Adult Crime (ages 19-44)									
CJS expenditures	62,803	-	28,077	0.118	3,313	-	0	-	0
Tangible victim costs	65,849	-	29,439	0.118	3,474	-	0	-	0
Intangible victim costs	216,763	-	96,909	0.118	11,435	-	0	-	0
Child abuse and neglect (ages 4-17)									
CWS expenditures	50,669	10	41,199	0.075	3,090	0.013	536	0.060	2,472
Tangible victim costs	8,797	10	7,153	0.075	536	0.013	93	0.060	429
Intangible victim costs (ages 4-44)	86,482	-	49,384	0.075	3,704	0.013	642	0.060	2,963
Child care (ages 3-4)	4,472	3 to 4	-	-	4,387	-	0	-	1,512
College expenditures, 2 years									
Public expenditures (2/3)	(8,031)	18	(5,155)	0.038	(196)	0.017	(88)	0.029	(149)
Private expenditures (1/3)	(4,016)	18	(2,578)	0.038	(98)	0.017	(44)	0.029	(75)
Adult Depression									
Treatment and employment costs	18,821	22	10,733	0.046	494	-	0	0.04	429
Substance misuse (ages 16-44)									
Treatment, medical, productivity and opportunity costs	134,055	-	62,212	0.045	2,800	-	0	-	0
Daily tobacco use	1,211,280	-	651,122	.023	14,976	-	0	-	0
Total Benefit (including reduced tobacco use)	-	-	-	-	107,196	-	15,064	-	42,520
Total Benefit (excluding reduced tobacco use)					*92,220*	*-*	*15,064*	*-*	*42,520*
Total Benefit (excluding intangibles)	-	-	-	-	62,896	-	13,280	-	29,640
Public Benefits (excludes private benefits)	-	-	-	-	61,246	-	8,000	-	26,884

Appendix A
Continued

	Estimate in 2007 Dollars	Average Age of Benefit	Present Value at age 3	Preschool Effect	Preschool Benefit	School-age Effect	School-age Benefit	Extended Effect	Extended Benefit
PROGRAM COSTS									
Preschool (ages 3-4)									
One year per child	5,597	4	5,434	-	-	-	-	-	-
Average per child (1.55 years)	8,675	3 to 4	*8,512*	-	-	-	-	-	-
School-age (ages 6-9)									
One year per child	2,010	6	1,839	-	-	-	-	-	-
Average per child (2.14 years)	4,301	6 to 9	*3,792*	-	-	-	-	-	-
Extended intervention (ages 3-9)									
Average per child (3.86 years)	13,363	3 to 9	12,719	-	-	-	-	-	-
Less extended program	-	-	7,556	-	-	-	-	-	-
Marginal cost of the extended program	-	-	*5,163*	-	-	-	-	-	-
NPV (including reduced tobacco use)	-	-	-	-	98,684	-	11,273	-	37,357
NPV (excluding reduced tobacco use)	-	-	-	-	*83,708*	-	*11,273*	-	*37,357*
NPV (excluding intangibles)					54,384		9,489		24,477
NPV (excludes private benefits)	-	-	-	-	52,733	-	4,208	-	21,721
Benefits/Costs (including reduced tobacco use)	-	-	-	-	12.59	-	3.97	-	8.24
Benefits/Costs (excluding reduced tobacco use)	-	-	-	-	*10.83*	-	*3.97*	-	*8.24*
Benefits/Costs (excluding intangibles)					7.39		3.50		5.74
Benefits/Costs (excludes private benefits)	-	-	-	-	7.20	-	2.11	-	5.21

Note: The benefits of program participation were estimated by multiplying the program coefficient in the explanatory model by the present value of the outcome in column 4. For example, in estimating the earnings/compensation benefit associated with the CPC preschool intervention, the program coefficient for high school completion (.081) was multiplied by the projected present value life-time earnings benefit from completing high school ($277,102).The effect was assumed to be zero when the program coefficient was less than 0.5% and not statistically significant. Intangibles include intangible juvenile and adult crime victim costs, intangible child abuse victim costs, and costs associated with the risk of premature death related to tobacco use.

Appendix B

Primary Sources for Estimating Economic Returns of the Chicago Child-Parent Centers

Category of Benefits and Cost	Year of Original Estimate	Primary Source
Program Benefits		
Grade retention (ages 5-14)		
Expenditure for one additional year of school	1996	Illinois State Board of Education (1997)
Special education (ages 6-18)		
Expenditure for one year	1995	Chicago Public Schools (1995)
Projected lifetime earnings/compensation		
High school completion vs. non-completion	1999	Barnett (1996); Bureau of the Census (2000)
Projected taxes on earnings (ages 18-65)		
High school completion vs. non-completion	1999	33.3% tax rate on earnings (15% federal; 3% state; 15.3% FICA)
Justice system (ages 10-44)		
Expenditures per crime (ages 10-18)	1998	Bureau of Justice Statistics (1997); Cohen (1988); Greenwood et al. (1998); Illinois Department of Corrections (1999);
Expenditures per crime (ages 19-44)	1993	Karoly et al. (1998); Stahl (1999).
Crime victims (ages 10-44)		
Tangible costs per victim (ages 10-18)	1998	Karoly et al. (1998); Miller, T.R., Cohen, M.A., & Wiersema, B. (1996); Greenwood et al. (1998)
Tangible costs per victim (ages 19-44)	1993	
Child abuse and neglect		
Tangible victim costs per report (ages 4-17) &	1993	Miller, T.R., Cohen, M.A., & Wiersema, B. (1996)
Intangible victim costs (age 4-44)		
Expenditures to child welfare system	1995 and 2006	Courtney (1998); Larner, Stevenson, & Behrman (1998); Illinois Department of Child and Family Services (2006)
Child care		
Average per child (1.5 years of preschool)	1986	U.S Department of Labor (2002)
College tuition (ages 18-22)		
Public expenditures for two years (2/3)	2006	
Personal expenditures for two years (1/3)	2006	Northern Illinois University; Southern Illinois University; City Colleges of Chicago
Adult Depression		
Treatment and employment costs	2000	Greenberg, P.E, Kessler, R.C., Birnbaum, H.G., Leong, S.A., Lowe, S.W., Berglund, P.A., & Corey-Lisle, P.K. (2003)
Frequent drug use (ages 16-44)		
Treatment, medical, productivity and opportunity costs	1997	Cohen, M. A. (1998)
Smoking	2002	Viscusi, W. K., & Hersch, J. (2007)
Program Costs		
Preschool (ages 3-4)		
One year per child	1986	
Average per child (1.55 yr.)	1986	Chicago Board of Education (2001); Chicago Public Schools (1986a)
School-age (ages 6-9)		
One year per child	1987	
Average per child (2.14 yr.)	1987	Chicago Public Schools (1986a); (1986b)
Extended intervention (ages 3-9)		
Average per child (3.87 yr.)	1987	Chicago Public Schools (1986a); (1986b)
Total Program (ages 3-9)		
Average per child (3.69 yr.)	1987	Chicago Public Schools (1986a); (1986b)

Appendix C

Out of Home Placement by Type of Placement (Ages 4 through 17): Estimated Daily Rate in 2006 Dollars and Mean Number of Days by Placement Type

Category of Out of Home Placement	N of Children	N of Placements	% of Total Placements	Mean Days	Daily Rate [a]	Expenditures
Relative [b]	48	109	22.7	728.6	$34.31	$24,998
Non-Relative [c]	28	67	14.0	275.8	66.77	18,415
Institution	29	122	25.4	224.0	293.47	65,737
Group Home	9	14	2.9	39.0	265.42	10,351
Independent Living	40	60	12.5	162.3	148.49	24,100
Pre/Adoptive Home [d]	9	9	1.9	4.1	50.54	207
Runaway [e]	30	64	13.3	138.3	-	-
Other/Unknown [f]	25	35	7.3	30.7	79.58	2,443
Total	75	480	100	1602.8	-	146,251

[a] *The estimated daily rates are based on data provided by the Illinois Department of Child and Family Services (IDCFS). IDCFS provided current rates for placements in Illinois identified as either: 1) relative foster care, 2) non-relative regular foster care, 3) specialized/treatment foster care, 4) institutional care, 5) group care, or 6) an independent/transitional living program. Daily rates for each placement and the associated number of children per placement are used to derive weighted average current daily rates by placement type. Simple average daily rates are also computed for comparison. The simple average daily rate is lower than the weighted average daily rate for institutional care ($291.05 vs. $293.47) and group homes ($254.14 vs. $265.42), and the simple average daily rate is higher for relative care ($34.90 vs. $34.31), non-relative regular and specialized/transitional care ($80.16 vs. $66.77), and independent/transitional living ($161.53 vs. $148.49). Given the range of daily rates and the number of children in each placement per placement category, the weighted average daily rates are expected to better represent actual costs.*

[b] *The estimated daily rate for relative care is based on the current average monthly rate in Illinois for licensed ($1,120.10) and unlicensed ($1,002.77) relative foster care. The weighted average monthly rate ($1,043.45) is converted to a daily rate by dividing by 365/12.*

[c] *The estimated daily rate for non-relative care is based on the current average monthly rate in Illinois for non-relative regular foster care ($1,096.96) and the weighted average current rate in Illinois for specialized/treatment foster care ($124.25). The current average monthly rate for non-relative regular foster care ($1,096.96) is converted to a daily rate by dividing by 365/12. The estimated daily rate for non-relative regular foster care ($36.06) and the weighted average rate for specialized/treatment foster care are weighted by the number of children currently in each program in Illinois.*

[d] *The estimated daily rate for pre/adoptive care is the simple average daily rate for relative foster care ($34.31) and non-relative foster care ($66.77). This is believed to be a conservative estimate given the current daily rate for institutional and group care. Also, the simple average daily rate is lower than the weighted average rate ($50.54 vs. $51.08). Because the mean number of days in pre/adoptive status is relatively low (4.1 days), the monetary outcome associated with pre/adoptive care is not expected to greatly impact the overall estimate.*

[e] *The costs associated with days in runaway status are excluded from the analysis. Among other services, temporary shelter and policing are expected to be consumed by runaways. However, it is difficult to accurately determine the degree to which runaways consume such services. To avoid the risk of overestimating the final outcome, we did not attempt to assign a rate to days in runaway status.*

[f] *The estimated daily rate for "other/unknown" is the weighted average rate for relative care, non-relative care, institutional care, group care, and independent/transitional living. The weights are based on the current proportion of children in each type of setting in Illinois. Therefore, in estimating the daily rate for "other/unknown", the probability of being either in relative care, non-relative care, institutional care, group care, or independent living is assumed to be equal to the current probability in Illinois.*

Appendix D
Sensitivity Analysis

TABLE D1
Net Present Value and Benefit-Cost Ratio for the Preschool, School-age, and Extended Interventions at Various Discount Rates (2007 dollars)

	Annual Discount Rate						
	0%	3%	5%	7%	10%	15%	20%
Preschool							
Cost	$8,675	$8,512	$8,409	$8,309	$8,166	$7,945	$7,742
Benefits	204,104	92,220	61,670	44,432	29,989	18,374	12,764
Net Present Value	195,429	83,708	53,261	36,123	21,822	10,429	5,021
Benefits/Costs	23.53	10.83	7.33	5.35	3.67	2.31	1.65
School-age							
Cost	4,225	3,792	3,535	3,300	2,986	2,543	2,183
Benefits	37,750	15,064	9,546	6,646	4,343	2,534	1,639
Net Present Value	33,526	11,273	6,011	3,345	1,357	(9)	(544)
Benefits/Costs	8.94	3.97	2.70	2.01	1.45	1.00	0.75
Extended							
Cost	5,520	5,163	4,950	4,754	4,489	4,113	3,801
Benefits	87,513	42,520	30,131	22,873	16,362	10,492	7,296
Net Present Value	81,993	37,357	25,181	18,119	11,873	6,379	3,495
Benefits/Costs	15.85	8.24	6.09	4.81	3.64	2.55	1.92

Note: Program benefits exclude the estimated value of reduced daily tobacco use. Other intangible benefits (e.g., averted abuse and neglect victimization costs) are included.

The estimated internal rates of return (IRR) of the preschool, school-age, and extended programs are approximately 27%, 11%, and 25%, respectively. The IRR of the preschool and extended programs are relatively high because each program is associated with large child care and abuse and neglect benefits occurring soon after program implementation, and, thus, discounted back to age 3 over a small number of periods. The private child care benefit, occurring at ages 3 and 4, attributed to the CPC preschool program is equal to approximately 52% of the average cost of the preschool program. The child abuse and neglect benefit attributed to the preschool program is equal to 86% of the average cost of the preschool program. The private child care benefit attributed to the extended program is equal to 29% of the average cost of the extended program, above and beyond the less extended program.

Excluding child care and abuse and neglect benefits, the estimated IRR of the preschool, school-age, and extended programs are approximately 18%, 10%, and 18%, respectively. Limiting the benefits to earnings, income tax revenues, and juvenile and adult crime related outcomes, the IRR of the preschool, school-age, and extended programs are 16%, 6%, and 14%, respectively.

The net present value estimates and benefit-cost ratios assuming annual earnings growth rates between 0% and 3% for the preschool, school-age, and extended programs are presented in table D2. For the preschool program, changing the real annual earnings growth rate from 0% to 3% increases the net present value estimate by approximately 19% (from $75,336 to $89,713). For the

school-age and extended programs, changing the annual rate from 0% to 3% increase the net present value estimate by 46% and 21%, respectively. The age 26 analysis assumes a 2% real annual growth in earnings.

TABLE D2
Sensitivity of Net Present Value Estimates and Cost-Benefit Ratios to the Income Growth Rate (2007 dollars, 3% real annual discount rate)

Real Annual Growth in Earnings	Preschool Program		School-age Program		Extended Program	
	NPV	B/C	NPV	B/C	NPV	B/C
0.0%	$75,336	$9.85	$8,895	$3.35	$33,326	$7.45
0.5%	77,068	10.05	9,387	3.48	34,160	7.62
1.0%	79,019	10.28	9,941	3.62	35,099	7.80
1.5%	81,220	10.54	10,566	3.79	36,159	8.00
2.0%	**83,708**	**10.83**	**11,272**	**3.97**	**37,357**	**8.24**
2.5%	86,523	11.16	12,072	4.18	38,713	8.50
3.0%	89,713	11.54	12,978	4.42	40,248	8.80

Note: NPV = net present value and B/C = estimated present value of program benefits divided by the present value of the average program cost. The value of the estimated CPC preschool effect on daily tobacco use is excluded, and other intangible benefits are included.

The results of a Monte Carlo Analysis are presented in table D3. The results are based on 10,000 iterations. The estimated CPC program effects employed in the age 26 cost-benefit analysis are assumed to be normally distributed. Employing the predicted program effects reported in Appendix A and the associated standard errors, estimated effects are drawn independently for 10,000 iterations. The average costs for each program (preschool, school-age, and extended), the child care benefit (attributed to the preschool and extended programs), the real annual discount rate (3%), the annual rate of growth in earnings (2%), and the fringe benefit rate (43.5%) are held constant.

TABLE D3

Monte Carlo Analysis Results (10,000 iterations, 2007 dollars, 3% real annual discount rate)

	B/C	NPV
Preschool		
Mean	10.83	83,673
Min	4.61	30,707
Max	17.77	142,753
School-age (0 vs. 1-3)		
Mean	3.97	11,272
Min	(6.19)	(27,248)
Max	14.71	51,990
Extended (1-3 vs. 4-6)		
Mean	8.24	37,405
Min	(19,710)	(2.82)
Max	89,504	18.34

Note: NPV = net present value and B/C = estimated present value of program benefits divided by the present value of the average program cost. The value of the estimated CPC preschool effect on daily tobacco use is excluded, and other intangible benefits are included. The net present value of preschool intervention is positive 100% of the time. The net present value of the school-age intervention is positive 86% of the time and the net present value of the extended intervention is positive more than 99% of the time.

TABLE D4

Program Costs, Benefits, and Monetized Standard Error of Estimated Program Effects (2007 dollars, 3% real annual discount rate)

	Present Value at age 3	Preschool Effect (SE)	Preschool Benefit	SE Preschool	School-age Effect (SE)	School-age Benefit	SE School-age	Extended Effect (SE)	Extended Benefit	SE Extended
Grade retention (ages 5-14)	$5,716	0.154	$880	$226	0.105	$600	$177	0.104	$594	$165
Special Education (ages 6-18)	7,596	0.7	5,317	1,573	0.48	3,646	1,252	0.67	5,089	1,274
Earnings (ages 18-65)	277,102	0.081	22,445	7,537	0.023	6,373	7,041	0.039	10,807	7,399
Tax contributions (ages 18-65)	78,996	0.081	6,399	2,149	0.023	1,817	2,007	0.039	3,081	2,109
Juvenile Crime (ages 10-18)										
CJS expenditures	17,414	0.33	5,747	2,123	-	0	-	0.14	2,438	1,881
Tangible victim costs	18,258	0.236	4,309	1,716	0.019	347	1,153	0.165	3,013	2,561
Intangible victim costs	60,104	0.236	14,185	5,648	0.019	1,142	3,795	0.165	9,917	8,431
Adult Crime (ages 19-44)										
CJS expenditures	28,077	0.118	3,313	1,674	-	0	-	0	0	-
Tangible victim costs	29,439	0.118	3,474	1,755	-	0	-	0	0	-
Intangible victim costs	96,909	0.118	11,435	5,777	-	0	-	0	0	-
Child abuse and neglect (ages 4-17)										
CWS expenditures	41,199	0.075	3,090	1,074	0.013	536	858	0.060	2,472	822
Tangible victim costs	7,153	0.075	536	186	0.013	93	149	0.060	429	143
Intangible victim costs (ages 4-44)	49,384	0.075	3,704	1,287	0.013	642	1,029	0.060	2,963	986
Child care (ages 3-4)	-	-	4,387	-	-	0	-	-	1,512	-
College expenditures, 2 years										
Public expenditures (2/3)	(5,155)	0.038	(196)	89	0.017	(88)	89	0.029	(149)	100
Private expenditures (1/3)	(2,578)	0.038	(98)	45	0.017	(44)	44	0.029	(75)	50
Adult Depression										
Treatment and employment costs	10,733	0.046	494	266	-	0	-	0.04	429	262
Substance misuse (ages 16-44)										
Treatment, medical, productivity and opportunity costs	62,212	0.045	2,800	1,424	-	0	-	-	0	-
Total Benefit	-	-	92,220	34,549	-	15,064	17,594	-	42,520	26,182
Public Benefit	-	-	61,246	25,493	-	8,000	9,331	-	26,884	17,605
Cost Per Participant	-	-	8,512	-	-	3,792	-	-	5,163	

Note: The standard error of the estimated program effect is monetized by multiply the standard error by the present value of the outcome in column 2. The standard error of total program benefits is assumed to be equal to the sum of the monetized standard errors. The standard error of the net present value estimate is assumed to be equal to the standard error of total program benefits minus the estimated cost of the program.

APPENDIX E

Additional Estimated Effects for Three Measures of Participation in the Child-Parent Centers

Domain and Measure	N	Preschool Group	Comparison Group	Diff.	*p*-value	School-Age Group	Comparison Group	Diff.	*p*-value
School achievement									
Age 5 cognitive composite	1531	49.0	44.3	4.7	<.001	-	-	-	-
Age 9 reading achievement	1286	98.2	93.5	4.7	<.001	98.4	93.4	5.0	<.001
Age 14 ITBS reading achievement	1344	147.1	140.9	5.9	<.001	145.0	142.7	3.0	0.03
Age 14/15 consumer skills, % passing	1159	62.5	52.3	10.2	<.01	61.0	53.8	7.2	<.05
School remedial services									
Grade retention by age 15, %	1377	20.7	35.2	-14.5	<.001	20.7	32.5	-11.8	<.001
Special education by age 18, %	1377	12.4	20.2	-7.8	0.006	13.0	17.9	-4.9	0.04
Number of years of special education from ages 6 to 18	1377	0.81	1.36	-0.55	0.003	0.86	1.19	-0.33	0.04
Educational attainment by age 24									
High school completion, %	1372	79.5	71.4	8.1	0.002	77.8	75.5	2.3	0.36
Highest grade completed	1367	12.0	11.7	0.3	0.002	11.9	11.9	0.1	0.62
Any 4-year college attendance, %	1372	13.5	10.4	3.1	0.13	13.2	11.3	1.9	0.33
Juvenile delinquency									
Petition to juvenile court for violent offense, %	1404	9.0	15.3	-6.3	0.002	10.8	11.8	-1.0	0.58
Adult crime by age 26									
Any arrest, %	1473	41.4	44.9	-3.5	0.18	43.0	42.1	0.9	0.73
Any incarceration or jail, %	1473	9.8	19.6	-9.8	0.01	14.4	13.3	1.1	0.75
Any conviction for violent offense, %	1473	9.8	12.9	-3.1	0.08	12.0	9.4	2.6	0.12
Health and insurance by age 26									
Any private insurance, %	1304	48.7	41.5	7.2	0.03	46.6	45.7	0.9	0.77
Any public insurance, %	1304	27.1	22.1	5.0	0.08	23.4	28.0	-4.6	0.10
Socioeconomic status by age 24									
Socioeconomic status (0 to 8 scale)	1257	2.9	2.61	0.29	0.008	2.82	2.75	0.07	0.53
Socioeconomic status ≥ 5, %	1257	18.9	13.4	5.5	0.03	17.1	16.6	0.5	0.83

(Continued on next page)

Domain and Measure	N	Extended Intervention Group	Non-extended Intervention Group	Diff.	*p*-value
School achievement					
Age 9 reading achievement	980	98.4	93.4	5.0	0.004
Age 14 ITBS reading achievement	1027	148.2	143.6	4.6	0.001
Age 14/15 consumer skills, % passing	885	63.7	57.7	6.0	0.03
School remedial services					
Grade retention by age 15, %	1152	15.1	22.2	-7.1	0.004
Special education by age 18, %	1152	10.0	14.2	-4.2	0.05
Number of years of special education from ages 6 to 18	1152	0.63	1.05	-0.42	0.004
Educational attainment by age 24					
High school completion, %	1035	80.7	76.8	3.9	0.15
Juvenile delinquency					
Petition to juvenile court for violent offense, %	1067	9.3	12.4	-3.1	0.10
Adult crime by age 26					
Any arrest, %	1110	41.9	42.0	-0.1	0.96
Any incarceration or jail, %	1110	9.1	15.0	-5.9	0.14
Any conviction for violent offense, %	1110	9.9	11.5	-1.6	0.39
Health and insurance by age 26					
Any private insurance, %	977	51.6	43.2	8.4	0.01
Any public insurance, %	977	23.5	27.1	-3.6	0.23
Socioeconomic status by age 24					
Socioeconomic status (0 to 8 scale)	945	2.98	2.74	0.24	0.03
Socioeconomic status ≥ 5, %	945	19.5	17.1	2.4	0.36

Note: Diff. = difference. Coefficients are from linear, probit, or negative binomial regression analysis transformed to marginal effects using Stata version 10.0. Coefficients for school achievement and juvenile delinquency measures are adjusted for sex of child, race/ethnicity, the risk index, program sites, and earlier/later program participation. Coefficients for school remedial services are based on an alternative model specification, adjusting for 8 indicators of preprogram risk status, sex of child , race/ethnicity, child welfare history, a dummy-coded variable for missing data on risk status, and program sites. The remaining coefficients are adjusted for 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history, and a dummy-coded variable for missing data on risk status. All coefficients associated with the extended program are adjusted for word analysis scores at the end of kindergarten. Socioeconomic status is a two factor index, which equally accounts for educational attainment by age 24 and occupational prestige (Barratt, 2005; Davis et. al., 1991; Hauser & Warren, 1997; Hollingshead, 1957; 1975).

APPENDIX F

Estimated Benefits and Costs Associated with Alternative Levels of CPC Intervention (2007 dollars, 3% real annual discount rate)

Cost or Benefit Category	Preschool Benefit (1 year)	Preschool Benefit (2 years)	School-age Benefit (1year)	School-age Benefit (2-3 years)	Extended Benefit (1-3 v 4 years)	Extended Benefit (1-3 v 5-6 years)
Grade retention (ages 5-14)	669	995	69	726	269	1,035
Special Education (ages 6-18)	4,056	5,530	-	3,950	5,226	4,557
Earnings (ages 18-65)	21,614	20,506	14,686	4,434	11,361	9,421
Tax contributions (ages 18-65)	6,162	5,846	4,187	1,264	3,239	2,686
Juvenile Crime (ages 10-18)						
CJS expenditures	5,259	6,147	-	-	1,933	2,490
Tangible victim costs	3,067	3,633	-	-	3,469	5,423
Intangible victim costs	10,097	11,961	-	-	11,420	17,851
Adult Crime (ages 19-44)						
CJS expenditures	2,302	3,903	-	-	-	-
Tangible victim costs	2,414	4,092	-	-	-	-
Intangible victim costs	7,947	13,470	-	-	-	-
Child abuse and neglect (ages 4-17)						
CWS expenditures	1,730	3,955	-	906	2,472	1,236
Tangible victim costs	300	687	-	157	429	215
Intangible victim costs	2,074	4,741	-	1,086	2,963	1,482
Child care (ages 3-4)	3,203	6,077		-	1,625	1,261
College expenditures, 2 years						
Public expenditures (2/3)	(217)	(222)	-	(113)	(149)	(149)
Private expenditures (1/3)	(108)	(111)	-	(57)	(75)	(75)
Adult Depression		-				
Treatment and employment costs	472	451	-	-	590	-
Frequent drug use (ages 16-44)		-				
Treatment, medical, productivity	2,737	2,551	-	-	-	-
and opportunity costs		-				
Total Benefit	73,780	94,210	18,942	12,353	44,772	47,432
Public Benefit	46,697	62,311	4,255	6,733	28,468	35,128
Cost Per Participant	5,434	11,031	1,839	4,266	4,805	5,979
Net Present Value	68,347	83,179	17,103	8,087	39,967	41,453
Benefit-Cost Ratio	13.58	8.54	10.30	2.90	9.32	7.93

Note: Numbers may not be exact due to rounding.