

The Economics of Investing in New Mexico's State Funded PreK Program

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Rationale for the Economic Impact Analysis

Leading researchers have concluded that:

- It is good public policy to see early childhood as a top economic development issue in the U.S.
- The return on pre-kindergarten investment is greater than other public and private investments that states undertake.

New Mexico Pre-Kindergarten Economic Impact Analysis

Purpose:

Estimate the net present value benefits generated from investing in pre-kindergarten services for 4-year old children in New Mexico.

Research Question:

What is the expected economic impact to NM of implementing the state-wide PreK program with access for all 4-year olds?

Methodology

- **Similar to the methodology used in the Rand Study of the Economic Impact of Preschool in California.**
- **Cost estimates for New Mexico State Funded PreK services:**
 - **Based on New Mexico PreK program features and New Mexico salary data.**
- **Benefits:**
 - **Based on results from high quality longitudinal studies that share many of New Mexico's current State Funded PreK program features.**
 - **New Mexico data were used to value dollar benefits whenever possible.**
 - **Based on New Mexico demographic data.**

Services and Features of the New Mexico PreK Program

Feature	Specifics
Children served	Program access for all 4-year olds
Early learning standards	Comprehensive
Program intensity	Approximately 540 hours per year
Class size and staff-child ratios	Maximum class size of 20; staff-child ratio of 1:10
Teacher qualifications	Lead teacher has BA; instructional or educational assistant has CDA (child development associate) or equivalent)
Screening/referral and support	Vision, Hearing, health, and developmental; and support services
Meals	At least one meal
Monitoring	Site visits
Resources	No local matches

Source: Barnett et al. (2006). The state of preschool yearbook 2006. Assumption sheet from New Mexico PED, CYFD, Governor's Office, and Department of Finance and Administration for the economic impact study on New Mexico State Funded PreK.

NM PreK Features

- **Reflects the current New Mexico State Funded PreK service model.**
- **Features include research based quality standards recommended in the literature and by National Institute for Early Education Research.**
- **These features are similar to those used in Oklahoma's State Preschool Program and Rand study of preschool in California.**
- **We assume these features are met in the cost and benefit analysis.**

Estimating the Costs and Benefits from a New Mexico PreK Program

- **Benefits depend on the percentage of children who enroll in New Mexico's State Funded PreK Program:**
 - **The % by risk group:**
 - **Greater benefits for higher risk children**
 - **Positive benefits documented for all risk groups**
 - **By services children would have received without state funded PreK:**
 - **None**
 - **Other public preschool services**
 - **Other private preschool services**
- **The benefits attributed to participation in New Mexico State Funded PreK are estimated from findings in the Chicago Child-Parent Center Program study.**
- **The percentage of children in New Mexico who are high risk is greater than in the Rand study—we estimate about 40% of four year olds are high risk; 20% are medium risk and 40% are low risk.**

Findings From the Chicago Child-Parent Centers Program Found that for every 100 Children Served in this Preschool Program:

Education Outcomes: Grade retention Special education High School graduation	15 fewer children would ever repeat a grade 10 fewer children would ever use special education 11 more children graduate from high school
Child Welfare Outcomes: Abuse and neglect	5 fewer children experience abuse and neglect
Juvenile Crime Outcomes: Juvenile offenses	8 fewer children with juvenile court petitions
College Attendance: After high school graduation	Increased college attendance 1 ½ years
Adult Crime: Incarceration or jail Felony arrests Felony conviction Violent crime convictions	5 fewer any incarceration or jail by age 24 5 fewer felonies 4 fewer convictions 2 fewer convictions
Economic Status by Age 24: Quarterly income greater than \$3,000 Employed full time	4 more adults earned \$3,000 or more 2 more adults employed full time

Estimated Selected Impacts for NM Single-Year Cohort 4-Year-Olds Participating in State PreK Program

Outcome	Change Assuming Distribution of Benefits Among Participants
Education processes and attainment Reduction in the number of children ever retained in grade Reduction in the number of children ever using special education Reduction in the number of child years of special education use Increase in the number of high school graduates Increase in the number of child years in education	1,213 803 5,513 882 2,599
Child Maltreatment Reduction in the number of children with report of child abuse or neglect	417
Juvenile Crime Reduction in the number of children with a juvenile petition Reduction in the number of children with a juvenile petition for a violent offense	646 496

NOTES: The New Mexico annual cohort of 4-year-olds is assumed to be 30,000 children, and 70 percent of those children are assumed to participate in the State PreK program.

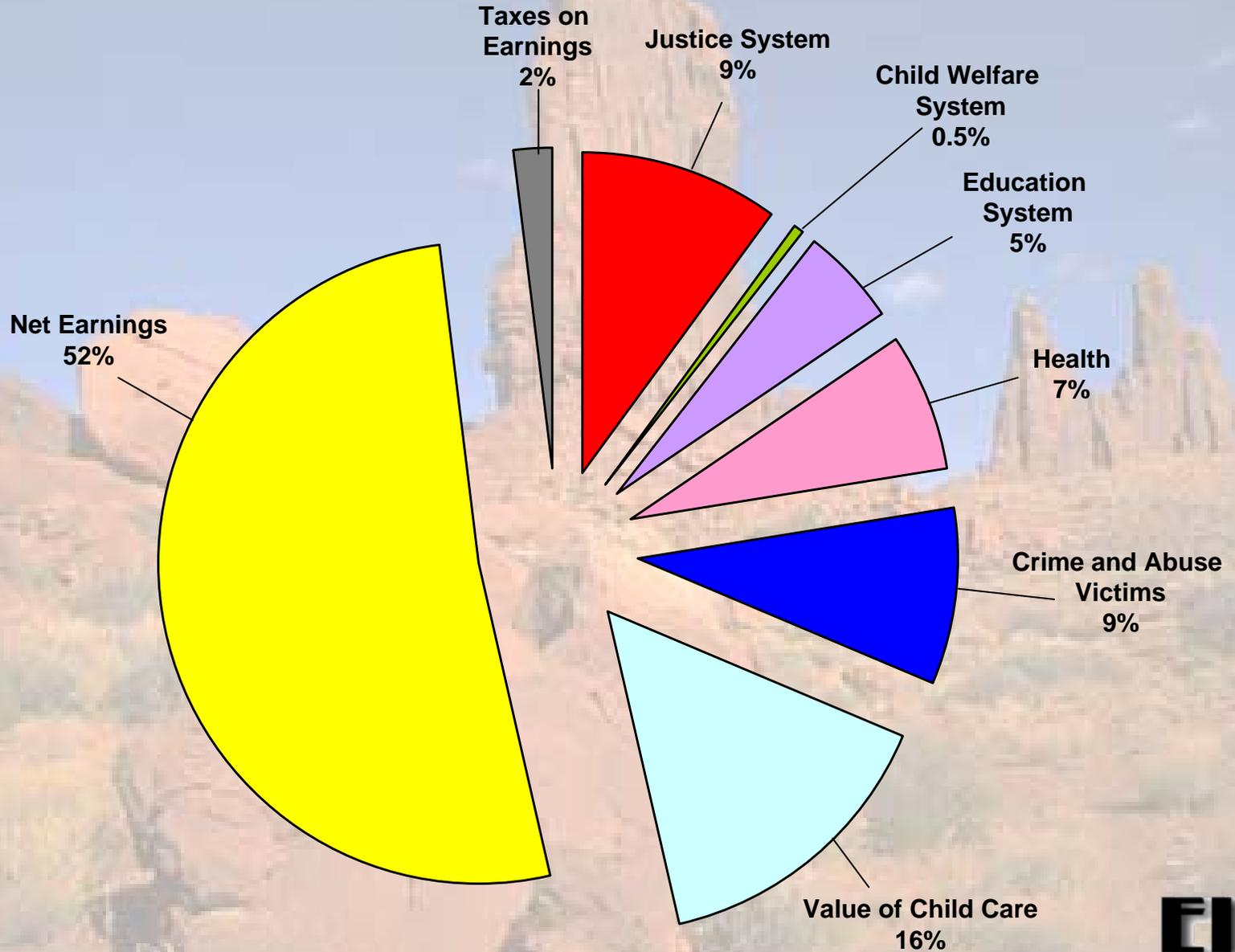
Present Value Costs and Benefit for New Mexico PreK in the Baseline Model

(in dollars per child and dollars per cohort of 4-year-olds)

Source of Costs or Benefits	Benefits (costs) to Society New Mexico Only		Benefits (costs) to Society U.S. Total	
	Dollars Per Child	Dollars Per Cohort (thousands)	Dollars Per Child	Dollars Per Cohort (thousands)
Program Costs	-2,961	-62,181	-2,961	-62,181
Program Benefits				
Education outcomes	889	18,669	1,174	24,654
Child welfare outcomes	114	2,394	190	3,990
Juvenile crime outcomes	1,831	38,451	1,831	38,451
Value of child care	2,272	47,712	2,272	47,712
College attendance	-113	-2,373	-113	-2,373
Adult crime outcome	932	19,572	932	19,572
Labor market earnings	7,771	163,191	10,845	227,745
Health	1,115	23,415	1,137	23,877
Total Benefits	14,811	311,031	18,268	383,628
Net Benefits	11,850	248,850	15,307	321,447
Benefit-Cost Ratio (\$/\$1)	5.00		6.17	
Internal rate of return (%)	18.1%		22.3%	

Notes: All amounts are in 2005 dollars and the present value of amounts over time where future values are discounted to age 4 of the participating child, using a 3 percent annual real discount rate. Dollars-per-cohort figures assume a cohort of 30,000 4-year-olds and a 70 percent State Funded PreK participation rate. Numbers may not add because of rounding.

Distribution of Present Value Benefits for New Mexico Society in the Baseline Model



Indirect and Non-Dollar Benefits: The Qualitative Residual

- **Some changes attributable to preschool are difficult to estimate in dollars and these include:**
 - **Better educated labor force – faster economic growth.**
 - **New technologies.**
 - **Increase New Mexico competitiveness.**
 - **Economic and social equality.**
 - **Quality of life changes.**
 - **Macroeconomic effects on the economy.**
 - **Intangible crime and child abuse costs to victims.**
 - **Multi-generational benefits not estimated.**

Summary of Findings

- **Using other participation assumptions than the baseline model show significant benefits—approximately \$3.72 (most conservative) to \$10.53 (least conservative) in benefits for every dollar spent by the state on PreK services.**
- **The participants in New Mexico are the largest beneficiaries—primarily because of increased lifetime earnings and the value of child care attributable to the program.**
- **These data provide strong evidence that New Mexico’s State Funded PreK program is a good investment for taxpayers, for New Mexico’s families and especially for young children.**

Summary of Findings

- One year of New Mexico State Funded PreK service is estimated to generate over \$ 18,000 in net present value per child for society—public and private sectors in New Mexico and the U.S.
- It is estimated that for every dollar invested in New Mexico State Funded PreK \$5.00 will be returned to New Mexico society and over \$6.00 will be returned to society in the U.S. as a whole.
- Approximately \$.94 is returned to New Mexico State and Local Government for every dollar spent on PreK.
- The children served by New Mexico PreK will generate a total of \$321 million per year in net present value benefits to society, assuming a 70% participation rate.
- There are significant benefits to the federal government from the state's investment in PreK services—primarily through additional tax revenues and reductions in income support payments.

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Executive Summary

The Economics of Investing in New Mexico's State-Funded Pre-K Program

New Mexico Pre-K Services result in a better educated labor force and better Quality of Life:

Providing high quality State-Funded Pre-K Services in New Mexico for one year results in:

- 1,213 fewer children ever retained in grade
- 803 fewer children ever using special education services
- 5,513 fewer years of special education services provided
- 882 more high school graduates
- 417 fewer cases of child abuse and neglect
- 1,323 additional college education years completed
- 2,599 more child years of education completed
- 2,599 fewer juvenile justice petitions
- 323 fewer adult felony convictions

New Mexico's State-funded Pre-K Program services are cost-beneficial and increase economic development.

New Mexico's State-funded Pre-K Program generates positive dollar benefits for participants, government and society:

- \$6.17 in benefits to society for every dollar spent.
- \$5.00 in benefits to New Mexico for every dollar spent.
- \$15,307 per child in net benefits for society.
- \$11,850 per child in net benefits to New Mexico.

Pre-K is a good economic investment:

- The total estimated rate of return to society is estimated at 22.3%
- The rate of return to New Mexico is estimated at 18.1%

New Mexico's \$62.2 million dollar per year investment in Pre-K will generate:

- \$321.5 million dollars per year in net benefits for society.
- \$248.8 million dollars per year in net benefits for New Mexico.

Investing in High Quality Pre-K Services Makes Good Economic Sense for New Mexico.

Preface

Throughout the United States, there is growing interest in providing publicly funded services to preschool-aged children for one or two years prior to kindergarten. New Mexico began a project at the beginning of the 2005-2006 school year that continues to the present. Assessment data was collected in fall, 2006 to evaluate the effect of the New Mexico State-funded Pre-K program on children's academic skills at kindergarten entry. These data, which will be repeated in fall, 2007 and fall, 2008, provide strong evidence that New Mexico Pre-K services had positive effects on children's language, literacy and math skills (Hustedt, Barnett & Jung, April, 2007). The authors conclude that this is the first evidence that will link the delivery of preschool education services with long-term school success and improved life outcomes. These improved life outcomes are the focus of the current evaluation. Other preschool studies have followed children into adulthood and documented significant impacts on life outcomes such as school attainment, delinquency, wages and health. Improvements in these outcomes translate into dollar benefits for taxpayers due to decreased spending for government services such as education, juvenile and adult justice systems and child welfare services. It also translates into dollar benefits for participants and their families because of positive effects on outcomes such as higher earnings and reduced child care expenses.

The benefits and the positive economic impacts of preschool are well documented in a number of high quality studies (Campbell et al., 2002; Reynolds et al., 2002, 2007; Schwinhart et al., 2005). These studies are the basis for a number of state evaluations of the economic impact of preschool to determine the amount of return that individual states might expect from making state-funded preschool services available for all children. The state economic impact studies in other states, such as California, Washington, and Massachusetts, showed that the impact of state-funded Pre-K programs, similar to New Mexico's, is positive and that society (state, local, federal governments and participants) receives between \$3.78 and \$17.07 for every dollar spent on high quality pre-kindergarten services. The results of these and other economic evaluations of State-funded Pre-Kindergarten Services in the United States was summarized by Goetze (2007) in preparation for the New Mexico State-funded Pre-K Economic Impact Analysis that is presented in this report.

The economic impact analysis of New Mexico Pre-K services examines the future benefits relative to the costs generated if high-quality preschool services are available to all 4 year old children in the state. The main questions that are addressed in the current evaluation include:

What is the direct benefit for participants, society and local, state and federal government if preschool education is provided to all 4 year old children in New Mexico?

What are the indirect benefits, which would be projected or intangible, for public and society as a whole if New Mexico implements preschool services for all 4 year old children and their families?

Report Narrative

The Status of Preschool Education in the United States

Data show that preschool participation rates of 3- and 4-year old children is increasing. Data from the October 2007 Current Population Survey (CPS) show the percentage of the population ages 3-4 enrolled in school over time. Figure 1 shows changes in enrollment of 3- and 4-year-old children between 1975 and 2005; Preschool enrollment was approximately 30% in 1975, which is approximately half the enrollment rate in 2005, which is 57%.

More detailed information can be obtained from the National Household Education Survey (NHES), which is conducted by the National Center for Education Statistics NCES. As shown in Figure 1, enrollment in preschool for both the 4-year-old cohort and 3-year-old cohort is increasing, but the enrollment rate for 4-year-olds is consistently higher than for 3-year-olds.

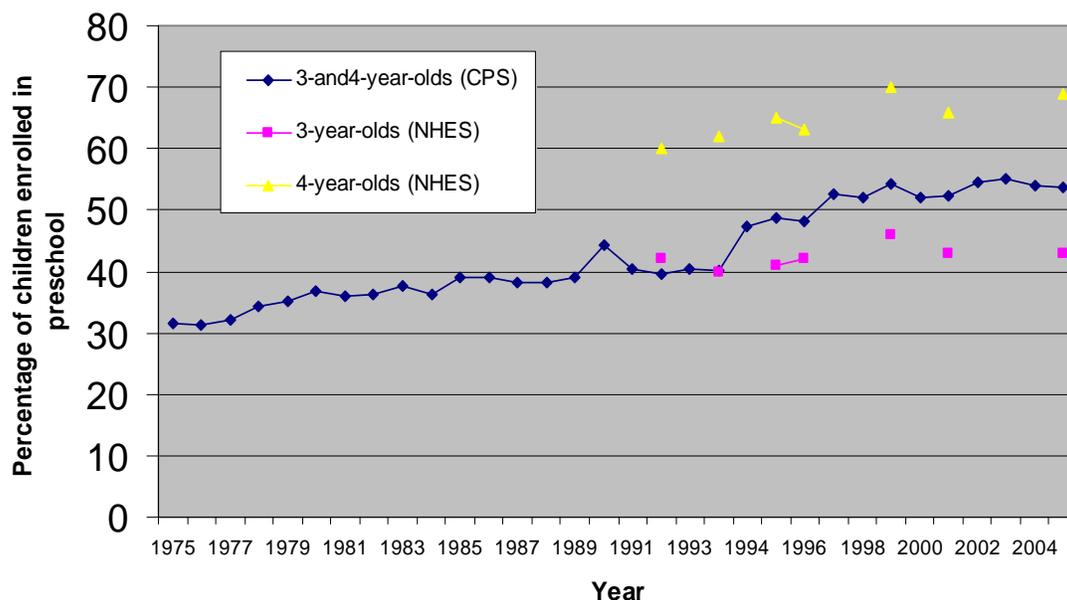


Figure 1. Preschool enrollment rates for U.S. 3- and 4-year-olds: 1975-2005.

SOURCE: CPS data--U.S. Census Bureau (2007), Current Population Survey report, school enrollment, historical tables, table A-2; NHES data--NCES (2007), early childhood education, Table 2-1.

NOTES: The CPS enrollment rates include a small fraction of 3- and 4-year-old children who are reported to be in kindergarten. NHES enrollment rates are based on children who were reported not to have yet entered kindergarten. NHES data measure the enrollment in day care centers, Head Start programs, preschool, nursery school, pre-kindergarten, and other early childhood programs.

Preschool education in the U.S. is funded through federal, state and local government as well as the private sector. A leading example of a preschool program that is support by the federal government is the Head Start program. The Head Start program has enrolled more than 24 million children since it began in 1965. The program represents the federal government's largest

commitment to preschool education, with spent \$6.8 billion to serve 11% of the nation's 4-year-olds and 7% of the nation's 3-year-olds in 2005-2006. The federal Head Start program provided \$7,287 in per child funding during the 2005 fiscal year, which is roughly double the average state spending per child for state-funded preschool (Barnett et al., 2006). The mission of Head Start is to promote school readiness by enhancing the social and cognitive development of children through the provision of educational, health, nutritional, social and other services to enrolled children and families. In the 2006 federal fiscal year, approximately 910,000 children were served in 18,900 centers. About 12% of the Head Start enrollment consisted of children with disabilities (Office of Head Start, 2007).

State-Funded Preschool Programs

States have shown their increasing support for preschool education by increasing state funding for those services. In the 1970's, fewer than ten states provide pre-kindergarten service (Gilliam & Zigler, 2004). During the 2005-2006 school year, 38 states funded pre-kindergarten initiatives. Nearly 942,800 children were enrolled in state-funded pre-kindergarten programs comprising 20% of the nation's 4-year-olds, up from 17% in 2004-2005 and just 14% in 2001-2002 (Barnett et al., 2006).

There are two primary categories of state preschool programs: targeted and universal. Targeted programs focus services and resources on more disadvantaged populations, who are in low-income families or have other risk factors such as disabilities. Universal programs provide services to low-risk children as well as to children from middle and higher income families. Georgia and Oklahoma have the highest enrollment rate in State-funded Preschool programs nationwide. Georgia Pre-K is funded through the state lottery, and per-pupil funding depends on local program factors such as teacher qualifications, the number of students in the class, and the program zone (metropolitan or non-metropolitan area). For example, programs with certified teachers receive a higher reimbursement rate than programs with teachers that have a 4-year degree without certification. Georgia offers pre-k services in all school districts, serves children for 6.5 hours a day, 5 days a week during the 9 month academic year.

The State-funded Preschool program in Oklahoma mainly operates in public schools, but some school districts subcontract with child care centers, Head Start programs and other community agencies to provide services. In Oklahoma's preschool program, all teachers must have a bachelor's degree with certification in early childhood education. Teachers are paid on the same state salary schedule as public school teachers. School districts that provide pre-kindergarten services are reimbursed at the per-pupil rate for the school district, although the funding amount depends on whether schools offer a half-day program or a full-day program (Barnett et al., 2006).

As of 2005-2006 all but 12 states reported some services and funding for state preschool. However, as shown in Table 1 there are still huge variations among different states in the characteristics of children they serve, number of quality standards they met and the quantity of resources provided. Table 1 summarizes the State-funded Pre-Kindergarten effort as of 2005-2006. These data are published by the National Institute for Early Education Research (NIEER) in their annual preschool year book (Barnett et al., 2006)

Table 1
State Pre-Kindergarten Program, 2005-2006 School Year

State	Enrollment Rate (%)					no. of quality Standards met	\$per child enrolled in State Pre-K
	State Pre-K		State Pre-K + Head Start				
	4-year-olds	3-year-olds	4-year-olds	3-year-olds			
OK	70.2	0	86.4	13.6	9	3,364	
GA	51.5	0	58.8	8.4	8	3,977	
VT	47	14.1	56.6	22.9	7	2,439	
FL	46.5	0	55.3	5.6	4	2,163	
TX	44.3	4.5	53.7	11.9	4	2,653	
WV	39.9	4.5	60.3	18.4	7	4,529	
WI	32.1	0.7	41.6	10	5/6 ^a	3,108	
SC	31	4.2	41.6	14.3	8	1,085	
MD	30.7	1	37	6.8	7	1,787	
KY	29.3	11	45.7	22.1	8	2,398	
NY	28.6	0.5	38.4	8.1	5 / 8 ^b	3,512	
NJ	24.9	14.8	31.1	19.3	9 / 6 / 8 ^c	9,854	
IL	23	14.4	33.5	22.3	9	3,298	
LA	21.6	0	35.6	15	7 / 8 / 9 ^d	5,012	
AR	18.2	10.6	32.9	21.4	9	4,386	
MI	16.2	0	30.6	9.7	6	3,934	
ME	15.5	0	27.8	9.2	4	1,793	
KS	14.5	0	24.2	7.7	3	2,554	
CT	13.7	3.2	21.4	9.5	6	7,101	
CO	13.5	2.2	20.9	6.6	4	3,056	
NC	12.2	0	21.3	4.9	10	3,892	
VA	11.1	0	18	4.4	7	3,396	
TN	10.6	0.5	23.3	8	9	4,061	
CA	9.9	4.5	20.4	10.7	4	3,341	
MA	9.8	8.8	17	14.8	6	3,619	
DE	7.8	0	17	4.9	8	6,261	
NM	6.8	0.6	24.8	12.3	5 / 4 ^e	2,269	
WA	6	1.4	14.9	6.7	6	5,886	
AZ	5.8	0	18.3	5.9	4	2,296	
PA	5.6	1.5	16.7	8.7	2	5,080	
OR	5	2.6	14.9	8.6	7	7,932	
IA	4.5	1.4	15.3	8.4	5	2,929	
OH	4.4	0	17.1	9.3	4	2,345	
MO	4	2.3	14.9	10.5	6	2,632	
NE	3.6	2.1	13.8	9.3	8	2,482	
NV	2.1	0.6	6.6	4.1	7	3,316	
MN	1.8	1	9.7	5.7	8	7,203	
AL	1.7	0	17.5	9.3	10	4,216	

State	Enrollment Rate (%)					
	State Pre-K		State Pre-K + Head Start			\$per child enrolled
	4-year-olds	3-year-olds	4-year-olds	3-year-olds	no. of quality	
AK	0	0	13.5	9.4	n.a.	0
HI	0	0	8.6	5.4	n.a.	0
ID	0	0	11.5	3.8	n.a.	0
IN	0	0	8.5	5.5	n.a.	0
MS	0	0	35.8	25.6	n.a.	0
MT	0	0	21.9	15.8	n.a.	0
NH	0	0	5.2	3.5	n.a.	0
ND	0	0	25.2	15.5	n.a.	0
RI	0	0	9.6	4.9	n.a.	0
SD	0	0	20.5	13.4	n.a.	0
UT	0	0	8.3	3.3	n.a.	0
WY	0	0	15.9	10.7	n.a.	0
all states	19.9	3	30.4	10.4		

SOURCE: Barnett et al. (2006), Tables 2, 4, 5, and 7.

NOTES:

n.a.= not applicable or not available. There are totally ten quality standards. See Barnett et al. (2006) for details.

^a For 4-year-old kindergarten and state-funded head start model, respectively.

^b For universal pre-kindergarten and targeted pre-kindergarten, respectively.

^c For Abbott preschool program, non-Abbott early childhood program and early launch to learning initiative, respectively.

^d For Student enhancement block grant program, LA4 and starting points programs and nonpublic schools early childhood development program, respectively.

^e For pre-K and child development program, respectively.

In the table, the states are ranked by the enrollment rate of 4-year-olds in the state-funded preschool program. Nationally, when enrollment in Head Start and State-funded pre-kindergarten is combined NIEER estimates that 30.4% of 4-year-olds and 10.4% of 3-year-olds are enrolled in preschool programs nationwide.

Compared to the 2002-2003 School Year (Barnett et al. 2006), Florida's investment in state-funded pre-kindergarten has increased faster than other states during the same time period. Florida's enrollment rate is 46.5%, up from zero in the 2002-2003 academic year. Similar changes also happened in Vermont and Alaska, which increased enrollment from 9.8% to 47% and from 0 to 28.8%, respectively. Hawaii canceled the budget for state pre-kindergarten and its enrollment rate went from 6.2% in 2002-2003 academic year to 0% in 2005-2006.

The number of quality standards met by states varied greatly as well. Ten program standards are recommended by NIEER as the minimum criteria needed to ensure effective pre-kindergarten programs. These standards include teacher credentials and training, class size, staff-child ratios and early learning standards; comprehensive services such as meal, vision, hearing, and health

screenings and referrals. Data from states suggest that there may be a tradeoff between the extent to which states meet these standards and the number of children served by the program. With constraints on funding states may be faced with the challenge of deciding whether to implement more comprehensive and expensive standards or increase enrollment of children into the pre-kindergarten program.

State funding per participant also shows that there is wide variation between the states on key pre-kindergarten variables. Tennessee is the most notable among states that made an incremental increase in 2005-2006. In that first year of its expanded pre-kindergarten effort, the state increased funding from an inflation-adjusted \$10.6 million to \$35 million. Ohio was the state with the largest decrease in total state spending during 2005-2006. Four states spent more than double the national average per child, including New Jersey, Oregon, Minnesota, and Connecticut. The average state spending per child was lower in 2005-2006 than the previous program year. While many states decreased per-child spending there was progress in other areas. Thirteen of the 38 states that funded pre-kindergarten services actually increased per-child spending in 2005-2006. The increase of \$2,163 per child due to Florida's initiative was the largest among this group of states (Barnett et al., 2006).

New Mexico's State-Funded Pre-K Program

New Mexico's State-funded Pre-K program was begun in 2005-2006 by providing state funds to a variety of existing public and private service providers to competitively provide preschool services to 4-year-old children in the state. This initiative provides funding for center-based preschool services through existing New Mexico State Public Education Department and Children Youth and Families Department providers. Services are provided to children regardless of the family's income. However, two thirds of the children who are served by New Mexico's Pre-K program must reside within a Title I elementary school zone.

New Mexico enrolled 6.8% of 4-year-old children in 2005-06 school year for a total enrollment of 1,959, up from 1% in previous years. The state funding per participant was \$2,269 and New Mexico's State-funded Pre-K program met five out of ten quality standards. The standards that were met were the staff child ratio, class size and early learning standards as well as most of the recommendations for comprehensive services. The standards that New Mexico has yet to achieve are primarily those associated with teacher credentials and training. New Mexico is implementing a Bachelors degree requirement for their Pre-K teachers with support from a state-funded TEACH scholarship program. Data from 2006-2007 (the 2008 fiscal year) shows that New Mexico provided funding for a total of 3,551 children or approximately 13% of the population of 4-year-olds in New Mexico. The per child reimbursement rate increased 4.56% and the state provided \$1,000,000 of new funding for start-up for classrooms and safety during the 2008 fiscal year. Total funding provided for New Mexico's State-funded Pre-K program increased from just under \$8 million dollars in 2006-2007 to just under \$14 million in 2007-2008. Funding for technical assistance and professional development nearly doubled between the 2006-07 and 2007-08 fiscal years. During the 2006-2007 year, nearly two-thirds of New Mexico's State-funded Pre-K teachers held a Bachelors of Arts degree.

Variation in Preschool Enrollment Patterns

Preschool enrollment rates in the U.S. vary with child and family characteristics such as age, sex, race, poverty status, family type, mother's education and mother's employment. As shown in Table 2, preschool enrollment varies greatly with mother's education level. Children whose mother has less than a high school diploma have a participation rate that is less than 50% of the enrollment rate of children whose mothers have a bachelor's degree or higher. By race, black children showed the highest enrollment rate, while Hispanic children show relatively low enrollment, even accounting for family income. The table also reflects relatively low participation rates for children from families who are below poverty. The variable, hours worked by the mother, is a positive predictor of preschool participation for children age 3-5.

Estimating the Economic Impact of State-Funded Pre-K in New Mexico

The assumptions and methodology used in the economic impact analysis are described in this section. We follow the assumptions that Karoly and Bigelow (2005) adopted in the Rand study as well as ones applied in a companion analysis funded by The David and Lucile Packard Foundation conducted by the Institute for Women's Policy Research (IWPR) and the American Institutes for Research (AIR; Golin et al., undated). These studies examined the economic impact of investing in a State-funded Pre-K Program for preschool children in the state of California. In order to understand the methodology for the New Mexico Economic Impact Analysis it is important to provide additional detail about the CPC Program study that serves as a basis for much of the benefit analysis. The impacts measured in the CPC program were used in the Karoly and Bigelow analysis and are used for the New Mexico evaluation as well. However, there were important differences between the Chicago CPC Program participants and the children that participate in a more comprehensive service program as planned for the State-funded Pre-K Program in New Mexico. Similar differences existed between the participants in the Karoly and Bigelow study and CPC as well. Weights were developed and applied to the estimated benefits as part of the Rand analysis for California and similar weights are used in the current analysis of New Mexico State-funded Pre-K to adjust for the differences between the participants.

The Chicago Parent-Child Center Program: Similarities and Differences

This study of the economic impact of the New Mexico State-funded Pre-K Program is based on impacts that were estimated from the Chicago Parent Center (CPC; Reynolds, 2002; Reynolds, Temple, Roberts, & Mann, 2001; Reynolds et al., 2007). The CPC longitudinal studies showed that the CPC Program significantly improved educational attainment, employment, earnings, crime and delinquency, and health behaviors like tobacco use and teenage pregnancy. The dollar benefits from these improved outcomes are estimated and compared to the cost of providing state-funded Pre-K services. The benefit-cost analysis will show the dollar return per dollar spent on state-funded Pre-K services in New Mexico.

The Chicago Child-Parent Centers Program is a large-scale preschool program operated through the public school system and serving low-income children from ages 3 to 9 (Reynolds et al.,

Table 2

Percentage of Children Ages 3–5 Who Were Enrolled in Preschool Programs
(by child and family characteristics: Various years, 1991–2005)

Child or family characteristic	1991	1993	1995	1996	1999	2001	2005
Total	53	53	55	55	60	56	57
Age							
3	42	40	41	42	46	43	43
4	60	62	65	63	70	66	69
5	64	66	75	73	77	73	69
Sex							
Male	52	53	55	55	61	54	60
Female	53	53	55	55	59	59	55
Race/ethnicity							
White	54	54	57	57	60	59	59
Black	58	57	60	65	73	64	66
Hispanic	39	43	37	39	44	40	43
Poverty status							
Poor	44	43	45	44	51	47	47
Nonpoor	56	56	59	59	62	59	60
Poverty status and race/ethnicity							
Poor							
White	41	40	43	39	43	46	45
Black	55	53	55	61	72	60	65
Hispanic	34	37	30	33	41	36	36
Nonpoor							
White	56	56	60	60	63	61	61
Black	62	63	66	69	74	66	68
Hispanic	42	48	44	45	47	42	48
Family type							
Two-parent household	54	52	55	54	59	57	57
One-parent or guardian-only household	50	54	56	58	62	56	58
Mother's education							
Less than high school	32	33	35	37	40	38	35
High school diploma or equivalent	46	43	48	49	52	47	49
Some college, including vocational/technical	60	60	57	58	63	62	56
Bachelor's degree or higher	72	73	75	73	74	70	73
Mother's employment							
35 hours or more per week	59	61	60	63	65	63	64
Less than 35 hours per week	58	57	62	64	64	61	61
Looking for work	43	48	52	47	55	47	42
Not in labor force	45	44	47	43	52	47	50

SOURCE: NCES (2007), Table 2-1.

NOTE: Estimates are based on children who have not yet entered kindergarten. Center-based programs include day care centers, Head Start programs, preschool, nursery school, pre-kindergarten, and other early childhood programs. Children without mothers in the home are not included in estimates for mother's education or mother's employment.

2002). The CPC Program preschool services are similar in several respects to those in the New Mexico model. First, the CPC program provides half-day structured language/basic skill learning approach during the school year with an emphasis on language arts and math skills. The lead teachers have a Bachelor degree and participate in regular professional development activities. The staff-child ratio is 1:17 which includes one teacher and one aide. The program was implemented on a large scale in the Chicago public schools with a solid evaluation component. Initially there were 4 sites and later expanded to 25 in 1978 (Reynolds, 2000) and to 25 centers serving over 4,000 preschool aged children in 1998. The CPC Program had other components, including a school-age program and served some children for more than one year (the average preschool attendance was 1.5 years). The average cost per child for one year of the CPC preschool program was \$4,400 in 1998 dollars (Reynolds et al.).

The CPC program was evaluated by the Chicago Longitudinal Study (CLS), using a quasi-experimental design. The children in the CPC Program attended schools in neighborhoods in which 66% of the families were low income. Because the comparison was quasi-experimental, extensive efforts were undertaken to reduce selection bias in the sample. First, children in the comparison group were recruited in neighborhoods where the CPC program was not available. Also, the participation rate is very high for the CPC program, about 80% (Reynolds et al., 2002). This high rate generates a sample that is more representative of the eligible population than a smaller self-selected sample. Extensive achievement, demographic, and socioeconomic data were collected on the subjects in both groups. For most of these characteristics the groups were statistically comparable. These variables were used to adjust for differences between the groups. Finally, methods were used to evaluate whether there was bias in the selection of participants into the CPC program and the results suggest that there is no selectivity bias in the sample. The CPC program findings are also very similar to those found in randomized experimental trials that examined the effects of similar preschool services on high-risk children with similar results to those shown in Table 4.

Table 3 shows the risk indicators for the CPC participants.

Table 3
Risk Indicators for Chicago Child-Parent Center Program

Risk indicators	Percentage
Parent/guardian has < high school degree	41
Eligible for free lunch subsidy	84
Family has \geq 4 children	14
In a school area where \geq 60% of students are low income	77
Parent/guardian not employed full- or part-time	56
Living in single-parent family	76
Missing on family background (education or lunch)	32
Minority status	100

Table 4
Estimated Effects of Participation in the Child-Parent Centers

Outcome	<i>N</i>	Preschool group	Control group	Difference	<i>p</i> -value
School achievement					
Age 5 ITBS cognitive development	1102	49.6	43.3	6.3	<.001
Age 6 ITBS word analysis	1531	66	59.8	6.2	<.001
Age 14 ITBS reading achievement	1158	147.1	141.6	5.5	<.01
School remedial services					
Grade retention by age 15 (%)	1281	23	38.4	-15.4	<.001
Special education by age 18 (%)	1281	14.4	24.6	-10.2	<.001
Years of special education from ages 6-18	1281	0.73	1.43	-0.7	0.06
Child maltreatment					
Indicated report of abuse/neglect from ages 4-17 (%)	1408	5	10.3	-5.3	<.001
Juvenile arrest by age 18					
Petition to juvenile court (%)	1404	16.9	25.1	-8.2	0.003
Petition to juvenile court for violent offense (%)	1404	9	15.3	-6.3	0.002
Number of petitions to juvenile court	1404	0.45	0.78	-0.33	0.02
Educational attainment by age 20/21					
High school completion, age 20	1233	49.7	38.5	11.2	0.01
Highest grade completed, age 20	1226	10.55	10.23	0.33	0.01
High school completion, age 21	1314	61.9	51.4	10.5	0.01
Highest grade completed, age 21	1295	11.23	10.87	0.36	0.013
Adult crime by age 24 (%)					
Any incarceration or jail	1368	20.6	25.6	-5	0.03
Economic status by age 24					
Receiving food stamps (%)	1368	52.3	56	-3.7	0.28
Public aid, overall (%)	1368	61.6	63.2	-1.6	0.64
Health by age 24 (%)					
Daily tobacco use	1368	17.9	22.1	-4.2	0.13
Any health insurance					
Private	1368	37.5	33.7	3.8	0.23
Public	1368	27.9	22.8	5.1	0.08

SOURCE: Reynolds et al. (2002), Table 4; Reynolds et al. (2007), Table 3.

NOTES: *N* is sample size for combined preschool group and control group. Results are for preschool group versus the control group. ITBS = Iowa Tests of Basic Skills. *P*-value: statistical significance.

CPC outcomes were measured based on school record, interviews with participants, teachers, and parents; and court records (Karoly & Bigelow, 2005). The Chicago Longitudinal Study (CLS) has now followed the children until they were age 25. Table 4 describes the main effects for the CPC program (to age 21), which are shown in five outcome areas: school achievement, school remedial services, child maltreatment, juvenile crime and delinquency, and educational attainment. These impacts were measured for CPC participants who attended the program for an average of 1.5 years.

By comparing the results of the preschool group and control group, we can see the significant impact of the CPC program intervention. For school achievement, there is a 5.5% difference in reading achievement by age 14, which can be translated into 4 to 5 months' improvement. The data related to school remedial services shows that the CPC participants were 15.4% less likely to repeat a grade than non-preschool children and 10.2% fewer were in special education by age 18. This corresponds to 0.7 years fewer special education service years between the ages of 6 to 18. For the educational attainment measured at age 20, high school completion is 11.2% higher for the CPC program group than for the control group. Children who attended the CPC program completed 0.33 of a year more of school than the non-CPC students. Similar results were found for the two groups at age 21.

In addition, the CPC program data suggest that child abuse and neglect was reduced for the treatment group children by over 5%. As of age 18, the proportion of youth with petitions to juvenile court who had attended the CPC program was 8.2% lower than those who did not attend the program. Of these petitions, 6.3% were petitions for violent offenses. The number of petitions to juvenile court for CPC participants was lower by 0.33 petitions. Adult crime was also down by approximately 5%. At the same time the latest findings show that economic status indicators are improved. This improvement is reflected in the participants lower use of government income support programs—a 2-4% reduction.

The health status of participants showed improvement based on several indicators including tobacco use which was about 4% lower for participants compared with those who did not attend the preschool program. Participants reported that they were more likely to receive health insurance coverage and less likely to have given birth while teenagers compared to those who did not participate in the CPC Program. While not all of these variables are included in the economic analysis they are worth noting. We exclude benefits associated with economic status changes since it is more of a re-distribution from participants (who decrease their income and food stamps) to the government (whose payments for income support and food stamps decline). The net gain in some studies is estimated based on administrative costs for the program. In the benefit analysis that follows these re-distributions are omitted.

To make the findings more concrete, we assume 100 disadvantaged children were served by the CPC program, while another 100 weren't. Thus among CPC participants, 6 more children reach the standard of ITBS cognitive development, 10 fewer children would ever receive special education services, and there would be 70 fewer child years of special education over the course of K to 12 education.

Estimating the Benefits from Open Enrollment: Adjusting for Varied Risk Factors

There are some important points of divergence between the New Mexico State Funded Pre-K Program and the Chicago CPC Program that require specific methodological adjustments. Of primary importance is that the CPC sample of children is different from the population of children that is the focus of the New Mexico effort. The CPC sample included only high risk children while the New Mexico Pre-K Program enrolls children regardless of these risk factors. There will be high, medium and low risk children who will receive New Mexico State-funded Pre-K Program services. While benefits are documented in the literature for all of these children the benefits are estimated as higher for high-risk children compared to children in medium and low risk groups (Barnett, Brown, & Shore, 2004). The methods that we have used to estimate the benefits to New Mexico takes into account these differences in the children that are served by discounting the benefits that were estimated for the CPC program. Second, essentially the Chicago CPC program was a comparison of a high quality preschool intervention to a no-program comparison group (approximately one fifth of the control group subjects attended Head Start). The CPC Program was not available to children in the comparison group. The New Mexico State-Funded Pre-K program will serve some children who were not in preschool prior to the delivery of the state-funded program but it will also serve children who would have received public or private preschool services without the New Mexico State-funded Pre-K program. The benefits to New Mexico are discounted to derive the additional benefit from adding State-Funded Pre-K to the mix of preschool programs available.

Table 5 shows the characteristics of New Mexico children according to risk factors such as race, ethnicity, marital status, family income, employment, etc. New Mexico has a higher percentage of families and children who are at risk than many other states. In the Karoly and Bigelow (2005) study, for example, approximately 29% of children were living in high poverty neighborhoods while the percentage in New Mexico is over 40%. These data suggest that over 40% of children are living in poverty and that is the number that we assume are at high risk and would receive the highest benefits from receiving the high quality New Mexico State-Funded Pre-K Program that is the focus of this evaluation. There are approximately 58% of children from low-income families in New Mexico (income below 200% of the federal poverty level in 2006). This suggests that approximately 40% are low risk (income above 200% of the poverty level). The remaining children, 20% are in-between these two extremes and are classified as medium risk for purposes of the analysis and medium benefits are allocated to this group in the economic impact analysis.

For the three risk groups in New Mexico we assume that 100% of the preschool benefits from the Chicago CPC program would accumulate to the high risk group of children if they attended no preschool program without the New Mexico State-funded Pre-K Program. There is little literature to quantify the percentage of benefit that would accrue to medium and low risk children who participate in the preschool program (Magnuson et al., 2004) and we adopt the same assumption as the Karoly and Bigelow (2005) study for these children. We assume that medium risk children receive 50% of the benefit and low risk children receive 25% of the benefit of the Chicago CPC Program in the absence of other preschool services. These assumptions are

Table 5
Characteristics of New Mexico Children, 2000

Characteristic	Percentage
<i>Young children¹</i>	
Race	
White alone	81.1
Black alone	1.86
Asian alone	1.1
Other	15.94
Ethnicity	
White non-Hispanic	29.6
Other non-Hispanic	16.3
Hispanic	54.0
Household type	
Married couple	58.5
Single mother	17.3
Single father	7.9
Other (other relative, non-relatives, group quarters)	16.3
Family income	
Below poverty	26.9
White non-Hispanic below poverty	4.1
Other non-Hispanic and below poverty	6.0
Hispanic and below poverty	16.8
Employment	
Living with two parents	
Both parents in labor force	31.1
Father only in labor force	26.1
Mother only in labor force	2.9
Neither parent in labor force	4.9
Living with mother only	
Mother in labor force	16.0
Mother not in labor force	8.4
Living with father only	
Father in labor force	8.3
Father not in labor force	2.3
Low income ²	
Parents do not have a high school degree and live in low-income families	15.3
Parents have a high school degree but no college education and live in low-income families	21.1
Parents have some college or more and live in low-income families	21.6
<i>Children under age 18</i>	
Children 5 to 17 with difficulty speaking English	10.2
Children 5 to 17 who are linguistically isolated ³	6.6
Children living in high-poverty neighborhoods (20% or more of the population is below poverty)	41.2

SOURCES: Annie E. Casey Foundation (2000); National Center for Children in Poverty (2006); Bureau of Business and Economic Research, University of New Mexico (2005).

¹ For race, ethnicity, household type, and family income, numbers are calculated with the population of children under age 5 as the base; for employment and low income, numbers are calculated with the population of children under age 6 as the base.

² Income below 200% of the federal poverty level (\$40,000) in 2006.

³ Linguistically isolated households are those where no one over age 14 speaks English “very well.”

part of our baseline program assumptions and the sensitivity of our results will be analyzed by adjusting these assumptions later in the report.

Estimating the Benefits of Open Enrollment: Adjusting for Current Preschool Enrollment

The second difference between the Chicago CPC Program sample and that of the New Mexico sample is related to the preschool experience that the New Mexico children have. Children in the comparison group for the Chicago CPC Program had no preschool program. However, we estimate that approximately 53% of 4-year-old children in New Mexico would have attended preschool. The percentage of children who attend preschool programs varies by risk group. For our baseline assumptions we use estimates from the National Institute for Early Education Research (NIEER, 2004). We assume 45% of high risk children participate in preschool. This fraction is approximately equivalent to the share of enrollment of children from poor families in 2001 nationwide. Likewise, we assume 55% of medium risk children participate in preschool. This fraction is approximately equivalent to the share of enrollment children in non-poor families in 2001 nationwide. We assume 60% of low risk children participate in preschool. This fraction is approximately equivalent to the share of enrollment for children in families with income between \$50,000 and \$75,000 in 2001 nationwide (National Institute for Early Education Research).

Table 6 shows the estimated distribution and number of children who would fall into the risk and participation group categories. Under the baseline assumption 53 out of every 100 children would have attended preschool. Of these 18 are high risk children, 11 are medium risk and 24 are low risk. We estimate that of the high risk children who attend preschool most attend public preschool—85% public preschool versus 15% in private preschool. This gives us the distribution of the high-risk children between public and private preschool. So for the high-risk group 15 children attend public preschool and 3 children attend private preschool programs (row d).

The second panel in Table 6 shows the assumption of universal preschool and that is that 70% of 4 year olds in each risk group participate in the New Mexico State-funded Pre-K Program. This percent is similar to actual participation rates in states that have implemented similar programs (Georgia and Oklahoma). The distribution of children in each risk group remains the same but we assume that when the New Mexico State-funded Pre-K program is implemented then enrollment in the program will increase and the breakdown between public and private enrollment changes for each group (row f). With the implementation of state-funded Pre-K we assume that the enrollment of children in public to private preschool will be 90% and 10% respectively (row f). This is similar to that observed in kindergarten and first grade. We distribute the enrollment into public and private programs differently by risk groups—with higher enrollment—95% for the high risk and lower for the low-risk group—85% in the public preschool program.

To estimate the combined enrollment rate in public and private programs (row g) we apply the public-private distribution (row f) to the public preschool participation rate (row e). Total enrollment in preschool now varies from 74% for high risk children to 82% for low risk with an

Table 6

Estimated Distribution of Children at Baseline and Under the New Mexico State-funded Pre-K Preschool Program, by Risk Status

Characteristics	High risk	Medium risk	Low risk	Total
<i>Baseline assumptions</i>				
a. Distribution of children (%)	40	20	40	100
b. Preschool participation rate (%)	45	55	60	53
c. Preschool distribution by type (%)				
Public	85	65	35	60
Private	15	35	65	40
TOTAL	100	100	100	100
d. Distribution of preschool participation by type (%)				
Public	15	8	8	31
Private	3	3	16	22
TOTAL	18	11	24	53
<i>Assumption under state-funded Pre-K program</i>				
a. Distribution of children (%)	40	20	40	100
e. Public preschool participation rate (%)	70	70	70	70
f. Preschool distribution by type (%)				
Public	95	90	85	90
Private	5	10	15	10
TOTAL	100	100	100	100
g. Preschool participation rate (%)				
Public	70	70	70	70
Private	4	8	12	9
TOTAL	74	78	82	79
h. Distribution of preschool participation by type (%)				
Public	28	14	28	70
Private	2	2	5	9
i. Change in participation by preschool (%)				
Public	+13	+6	+20	+39
Private	-1	-1	-11	-13
NET				+26
j. Type of preschool universal program participation would have attended at baseline (#)				
None	12	5	9	26
Public	15	8	8	31
Private	1	1	11	13
TOTAL	28	14	28	70

SOURCE: Estimated by author based on NCES 2007 and Karoly and Bigelow (2005), Table 2.8.

NOTES: a comparison of the distribution of children under the universal preschool assumptions (row h) versus the baseline (row d) shows the net change in the distribution of children by preschool type and risk level for every 100 children. This is labeled as the change in participants by preschool type (row i).

average total enrollment rate of 79% (row g). The higher rate for low risk is totally attributable to their higher enrollment rate in private preschool programs since the rate of public preschool enrollment is constant across the three risk groups.

In order to calculate the enrollment of children by risk group and public/private preschool program we apply the distribution of preschool type (row g) to the distribution of children (row a). So for the high risk group taking 70% of the 40 high risk children shows that 28 will participate in public preschool (row h). The difference between row h and row d gives the change in participation by preschool (row i). For high risk students this number is calculated as the difference between 28 and 15 or 13 additional high risk students enroll in public preschool with the full implementation of the State-funded New Mexico Pre-K Program. There are 39 additional children in every 100 who enroll in the state-funded Pre-K program.

The last section of Table 6 (row j) shows the distribution of participation in preschool without the New Mexico State-Funded Pre-K Program. The first row under none shows the children who would have received no preschool without the State-funded Program who now attend the state-funded program. The children in the public line of row j are those that would have attended a public preschool program without the State-Funded Pre-K Program. The children who are listed as private under row j are those children who would have attended a private program and switched to the State-Funded Pre-K program. Under the baseline assumptions we assume that the State-Funded Pre-K program is higher quality than the public program that children would have attended and that the New Mexico State-Funded Pre-K program is equivalent to the private program that the children would have attended. In summary, 26 of the 70 children who are assumed to participate in the New Mexico State-funded Pre-K program are estimated as new participants to preschool. 31 would have attended a lower quality publicly funded preschool program and 13 moved from an equivalent privately funded program to the State-Funded Pre-K program.

Table 7 shows the benefits assumptions that we apply to the children who will participate in the New Mexico State-funded Pre-K Program. These are the baseline assumptions that will be used in the benefit analysis that follows. These percentages take into account the difference in benefits that will accrue to children based on the differences in risk factors as well as preschool experience. As shown 100% of the CPC program benefits are assumed for the high risk children who did not attend preschool prior to the implementation of the New Mexico State-Funded Pre-K Program. Because the private program quality is assumed to be equivalent to the quality of the State-Funded Pre-K Program 0% of the benefit is applied to children who attended private preschool programs and switched to the new publicly funded preschool program. Those who would have attended a different publicly funded program and now attend the New Mexico State-Funded Pre-K Program are given a percentage of the Chicago CPC Program benefit that varies by risk group as shown. The weight derived for the baseline model is 0.2625.¹

¹ Twelve high-risk children with no preschool receive 100% of the benefit (.12 x 100%); 5 medium risk children receive 50% of the benefit (.05 x .5), and 9 receive 25% of the benefit (.09 x .25). Fifteen high-risk children would have attended public preschool and receive 50% of the benefit (.15 x .5) while 8 medium risk children would have attended public preschool and are assigned 25% of the benefit (line j, Table 6).

This gives equation $1 = 0.12 \times 1 + .05 \times .5 + .09 \times .25 + .15 \times .5 + .08 \times .25 = .2625$.

Table 7

Percentages of CPC Program (Maximum) Benefits Realized by Children of Differing Risk and Alternative Preschool Types at Baseline

Type of preschool the New Mexico State-funded Pre-K Program participants would have attended at Baseline	High risk	Medium risk	Low risk
None (%)	100	50	25
Public (%)	50	25	0
Private (%)	0	0	0

Estimated Impacts for a Cohort of 4-Year-Old Participants in the New Mexico State-Funded Pre-K Program

The estimated impacts for a single cohort of 4-year-old children in New Mexico are shown in Table 8. These estimates combine the impacts estimated in the Chicago CPC program for each of the outcomes shown. In addition the benefit percentages have been adjusted for each of the risk and preschool participant groups as shown in Table 7. The estimates are based on the projection that there will be approximately 30,000 4-year old children in New Mexico and that 70% of them will participate in the New Mexico State-Funded Pre-K Program.

As shown the number of children who improve their educational attainment is significant, even after discounting the benefits to adjust for assumptions about risk factors and preschool participation rates. Approximately 1,213 fewer children will be retained in grade and 803 fewer children will use special education services in each cohort served by the state-funded program. This translates into 5,513 fewer child years of special education used. In addition, 882 children will graduate from high school that would have dropped out and they will increase their total years of education achieved by 2,599.

It is estimated that there will be 417 fewer reports of child abuse or neglect. In New Mexico, it is estimated that about 30% of abuse and neglect cases involve abuse while 70% involve neglect. Juvenile justice petitions will be reduced by 2,599 and the number of children with violent offenses is estimated to fall by 496. Criminal justice cases for adults are also shown to decrease for this cohort. The changes include declines in arrests and convictions for violent crimes and for felonies.

The health outcomes of participants show moderate improvements with more preschool participants receiving private health insurance coverage. Fewer of the preschool participants use tobacco and fewer became parents while they were teenagers. Depression among this cohort is lower and disabilities are reported as slightly lower as well.

Table 8

**Estimated Impacts for Single-Year Cohort 4-year-olds Participating in the
New Mexico State-Funded Pre-K Program**

Outcome	Change assuming distribution of benefits among participants
Education process and attainment	
Reduction in number of children ever retained in grade	1,213
Reduction in number of children ever using special education	803
Reduction in number of child years of special education use	5,513
Increase in number of high school graduates	882
Increase in number of child years of education	2,599
Increase in college attendance years of education	1,323
Child maltreatment	
Reduction in number of children with report of child abuse or neglect	417
Juvenile crime	
Reduction in number of children with a juvenile petition	646
Reduction in number of children with a juvenile petition for a violent offense	496
Reduction in number of juvenile petitions	2,599
Adult crime	
Any incarceration or jail	394
Any arrest	331
Felony arrest	362
Any violent arrest	197
Any conviction	347
Felony conviction	323
Violent crime conviction	158
Health and mental health	
Had child when ages <18 years, females	75
Daily tobacco use	331
Private health insurance	299
Any disability	55
Reported any depression symptom	362

NOTE: The New Mexico annual cohort of 4-year-olds is assumed to be 30,000 children, and 70% of children are assumed to participate in the universal preschool program.

Benefit-Cost Analysis of the New Mexico State-Funded Pre-K Program

Cost-benefit analysis measures both costs and benefits in *dollars*. This type of analysis allows comparison of programs with similar or *dissimilar outcomes*. In the current analysis it means that outcomes related to better educational attainment can be combined with the value of improved outcomes such as decreased juvenile justice petitions and aggregated into one monetary number that summarizes both outcomes. With cost-benefit analysis, it is possible to compare apples to

oranges (inherently dissimilar outcomes) by valuating all outcomes in the common measure of dollars. It is also possible to compare apples to apples where outcomes are similar. For example, cost-benefit analysis may tell us that for every \$1 invested in preschool services, we are saving \$1.50 in reduced special education costs. This 50¢ net savings can be used to compare investments in either different or similar types of programs. Cost-benefit analysis is versatile because it translates the outcome variables into the common denominator of dollars.

In the cost-benefit analysis that follows a number of steps are involved. First, cost of the New Mexico State-Funded Pre-K Program is estimated based on amounts and value of the resources used to provide New Mexico State-funded Pre-K Program services to all 4-year-old children who enroll in the program. Second, the outcomes that are impacted by the preschool program are described and the dollar value of all outcomes is estimated and summed to determine the total benefits attributable to the program. Third, the monetary value of the total resource and total benefits is estimated and adjusted for inflation to calculate the present value of benefits during the same year; in this case the base year is 2005. The net present value of the program is aggregated for different groups in order to analyze the distribution of costs and benefits to those sectors—local, state and federal government, preschool participants and society as a whole. Table 9 describes the benefits and costs that are estimated in this analysis. It also shows the distribution of benefits and costs to different members of society (i.e., to whom those costs and benefits accrue) and in the end it will show the net gains (or losses) to each of these participants.

The next step in the cost-benefit analysis is to do a sensitivity analysis to determine whether the results of the cost-benefit analysis change or whether the conclusions of the analysis are different under alternative assumptions. In the sensitivity analysis for this report the assumptions that are changed include the percentage of benefit that accrues to the different preschool participants based on risk factors or preschool participation group. Finally, the limitations of cost-benefit analysis are considered as those limitations might affect the findings. For example, there are outcomes, such as changes in quality of life, which cannot be quantified in dollars and are omitted from the net present value and rate of return findings. Such omissions are a qualitative residual that is not part of the analysis but should be considered before key policy decisions are made.

Estimating the Cost of the New Mexico State-Funded Pre-K Program

The results of this economic impact analysis are based on the assumption that services would be available to all 4-year-old children living in New Mexico and that 70% of them would actually participate in the program. The costs of the State-funded New Mexico Pre-K program are estimated based on the program features shown in Table 10. This table describes the program requirements and age(s) of the children served, program intensity in terms of the hours of services delivered, and features related to providing a high quality program, such as class size, child-staff ratio and teacher qualifications. During a school year, the program provides 540 total hours of service, and the direct instruction time is 450 hours. The maximum class size is no more than 20 students, and the staff-child ratio is 1:10 or better. We assume that the head teacher in each classroom has a bachelor's degree, and the assistant teacher has a CDA (Child

Table 9

Distribution of Costs and Benefits from Improved Outcomes for New Mexico State-funded Pre-K Participants

Benefits and Cost-Savings	Source	Benefits and Cost-Savings Accrue to:			
		State and Local Government	Federal Government	Participants	Rest of Society
Fewer years spent in K-12 education	Reduced grade repetition	√			
Lower costs for special education	Reduced use of special education	√	√		
More years spent in K-12 education when dropping out is avoided	Increased educational attainment	√			
Lower costs to child welfare system and lower abuse and neglect victim costs	Reduced child maltreatment	√	√	√	
Lower costs to juvenile justice system and lower crime victim costs	Reduced contact with juvenile justice system	√			√
Value of subsidized child care for parents of participating children	Increased child care provided			√	
More years spent in postsecondary education	Increased educational attainment	√		√	
Lower costs to adult justice system and lower crime victim costs	Reduced contact with juvenile justice system	√			√
Increased lifetime earnings for participants and increased tax revenue to government	Increased educational attainment	√	√	√	
Lower costs to public health system and taxpayers	Reduced teen mothers	√	√		
Lower costs to public health system and participants	Reduced daily tobacco use	√		√	
Increased benefit to society	Increased private health insurance			√	

Table 10
Features of the New Mexico State-Funded Pre-K Program

Feature	Specifics
Children served	Program access for all 4-year-olds
Early learning standards	Comprehensive
Program intensity	Approximately 540 hours per year
Class size and staff:child ratios	Maximum class size of 20; staff-child ratio of 1:10
Teacher qualifications	Lead teacher has BA; associate teacher has CDA (child development associate) or equivalent; specialized training in Pre-K
Teacher in-service	At least 15 hours/year
Screening/referral and support services	Vision, hearing, health, and developmental; support services
Meals	At least one meal
Monitoring	Site visits
Resources	No local matches

SOURCE: Assumption sheet from New Mexico PED, CYFD, Governor's Office, and Department of Finance and Administration for the economic impact study on New Mexico state-funded pre-kindergarten

Development Associate credential) or equivalent. The education qualification for the head teacher, as noted above, is the same requirement in every state for kindergarten-level teachers and consistent with the recommendations of the National Research Council (Barnett et al., 2004; Bowman, Donovan, & Burns, 2001).

We also assume that all costs of the State-funded Pre-K Program are paid by the state of New Mexico and that the New Mexico State-funded Pre-K program will operate within the existing preschool infrastructure, with services delivered by both public and private PED and CYFD providers. Funding provided for preschool from other local, state and federal governments is assumed to continue to augment funding for the State-funded Pre-K Program.

The cost per child of providing the services described in Table 10 depends to a large extent on the labor costs for teachers and aides in New Mexico. The cost of the teachers was estimated based on the New Mexico Department of Labor wage rate for kindergarten teachers (excluding special education teachers) and that rate is \$43,000 in 2007. The cost of the associate teacher was estimated based on data from Head Start which listed the wage for a teacher with an Associate Arts Degree in New Mexico as \$24,100. Employee benefits were assumed to be the same as that used in the Rand analysis—33.6% of the wages. We estimated that one teacher and one aide would serve 40 students based on a staff-child ratio of 10:1 and assuming two sessions per day per staff member. The direct service personnel cost was estimated as \$2,241.14 in 2007 dollars discounted to 2005 gives a direct service cost of \$2,135. Non-personnel costs are estimated to be 27.92% of the total costs. This matches the percentage of non-personnel cost in the New Mexico FY08 State-funded Pre-K rollout and is very similar to the non-personnel cost percentage estimated in the Karoly and Bigelow (2005).

Benefit Estimates

The benefit estimates begin with the outcomes measured in the Chicago CPC Program study. The magnitude of each impact is the starting point for our benefit estimates. All benefits are estimated in 2005 dollars. The distributional analysis shows the benefits to: state and local government; the federal government; preschool program participants; and the rest of society. This is modeled after the analysis in Karoly and Bigelow (2005) and will show the benefits to each of these sectors as well as total benefits to society when all benefits are combined. Most of the methods used to estimate the value of benefits are very similar to those used in Karoly and Bigelow. Similar data sources were used although these are not identical because New Mexico data were used whenever possible to estimate the cost of services specific to the state. The age assumptions that were used in the application of benefits are the same as those used in the Karoly and Bigelow study and the assumptions that were used to distribute the costs and benefits are the same. The weight that is used was calculated based on Table 6, “Estimated Distribution of Children at Baseline and Under the New Mexico State-funded Pre-K Program, by Risk Status” and Table 7, “Percentages of CPC Program Benefits Realized by Children of differing Risk and Alternative Preschool Types at Baseline.” This weight adjusts the CPC Program impacts. The rationale for this weight was explained earlier in the report along with the ingredients that are included in it. The weighted percentage of benefit that will be used is 0.2625. All of the estimates of benefits were reduced by this weight except for the child care benefit and that was applied equally to all participants for the child care estimates since this benefit does not vary with the participant’s risk level.

Educational Attainment and Special Education Services

The cost of regular education services was estimated from data obtained by the New Mexico Public Education Department (PED). In 2005, the cost for regular K-12 education was \$6,035 per year. This cost was used to estimate the value of reducing grade retention and to estimate the cost or negative benefit of increasing the number of years of regular education years that participants complete. The benefit for grade retention is applied at age 19 since grade repetition will extend the student’s education to age 19. The cost for increased years of K-12 completed was applied at age 19. We assume that the changes in educational attainment apply to only one grade on average since the CPC program study does not specify so this may underestimate the benefits from this outcome. These assumptions are essentially the same as those used in the Bigelow and Karoly (2005) study.

The same cost data were used to estimate the value of increasing the high school graduation rate by 11 percentage points as of age 20 and for estimating the cost of .33 years more of schooling. These were both valued at \$6,035 per year and applied at age 19. All of these benefits are estimated as attributable to local and state government which pays for regular education services.

Special education services in the CPC program were reduced by 0.7 years between ages 6 and 18. Data on special education expenditure per student in 1994-95 was estimated from Parrish, et al, 1999-2000 since data for New Mexico special education cost was not available. This estimate, adjusted to 2005 dollars, was \$7,049 average cost per student in the U.S. New Mexico

is estimated to fund 80% of the special education costs per student (Campos, 2006) and the remaining 20% is applied as a benefit to the federal government.

It is estimated that the participants will attend an additional 1.5 years of postsecondary school. To estimate the cost of this outcome we used attendance data for each type of college, which includes research universities, comprehensive institutions and community colleges and independent community colleges, to weight the tuition and fees for each type of institution. The weighted tuition in New Mexico was estimated as \$2,614 in 2005 dollars for each full time equivalent student. The additional years of education are applied at age 19. In addition, student fees were estimated as 10% of estimated benefit (in this case cost or negative benefit). These costs or negative benefits of tuition were applied to state and local government and the student fees were applied to participants.

Child Welfare

The CPC impact suggests that substantiated cases of abuse and neglect were reduced by 5.3 percentage points. In New Mexico, 20.3 percent of child abuse and neglect victims are in foster care and the remaining 79.7 percent are in-home care (Department of Health and Human Services, 2005). The cost of foster care per participant was estimated at \$8,758 in 2005 dollars and the cost of in-home care per participant was \$3,652 in 2005 dollars (Courtney, Urban Institute Child Welfare surveys, NM Foster Care Report Card). Federal funding is estimated at 55.6% of total funding for Child Welfare Services in New Mexico and the residual 44.4 percent is attributed to state and local government. The benefit is applied at age 10.

An additional benefit was estimated as attributable to the reduction in child abuse and neglect cases, in the form of the reduced cost to the victims. The losses to victims include both tangible (cost of health care treatment) and intangible (pain and fear). We estimate only the tangible cost to the victim and this is based on an estimate of \$6,102 per victimization for child abuse cases and \$958 per victimization for child neglect cases in 1993 dollars (Miller, et al, 1996). In New Mexico, 30% of the cases involve abuse and 70% involve neglect (Children, Youth and Families Division). The impact and age application are the same as used in the estimate of the child welfare cost. However the benefits from victim costs accrue to the participants.

Criminal Justice

Juvenile justice system. The CPC program participants had .33 fewer petitions than those who did not participate in the program. Benefits are estimated as savings to the police and to the court systems from this reduction. Cost estimates are based on Miller, 1996 and 2001, which found that the cost per apprehended juvenile perpetrator is \$8,000 in 1993 dollars or \$10,812 in 2005 dollars. The CPC impact is applied as of age 14 and is a savings to state and local government. This analysis assumes that detention of the perpetrator is for one year. If detention is longer than this underestimates the benefit from this outcome.

Reduction in the number of juvenile crime also reduces the tangible and intangible costs to victims. The tangible costs are estimated by weighting the number of juvenile crimes by type of offense and then applying Miller, 1996 and 2001 estimates of the cost to victims by crime

category gives us a cost estimate of \$9,606 per juvenile crime in 2005 dollars. This benefit was applied at age 14 and accrues to the rest of society.

Adult crime. The CPC impact for this outcome was estimated at .05 and was applied to age 24. Corrections cost for the cumulative average population is \$14,378 (New Mexico Corrections Department). The New Mexico cost data were only available for the corrections portion of the total cost of criminal justice. These data were supplemented using national data for police, judicial and corrections cost and estimates for judicial and corrections were made based on the portion of those in total cost (Bureau of Justice Statistics). The estimate for the cost of adult crime to the police, judicial and corrections was \$45,091 in 2005 dollars.

Victim costs were estimated using data from Karoly and colleagues (1998). Karoly estimates that the victim costs are for an adult criminal career is 1.0485. This factor was applied to the crime cost to estimate the cost to victims.

Value of Child Care

The value of child care for families whose children participate in the preschool program was calculated as another benefit attributable to the New Mexico State-funded Pre-K Program. The cost of child care was estimated based on the mean wage of child care workers in New Mexico in 2005 which is \$7.65 per hour (New Mexico Department of Labor, 2005). This was applied to 450 hours of direct service per year to estimate the benefit per participant. This could be higher if transportation services are provided since the number of hours that the child would be in the care of the program would be greater than the direct service hours.

Compensation and Taxes

The benefits attributable to higher educational attainment of participants was estimated based on calculating the difference in median earnings for high school graduates and drop outs. This difference was \$6,184 in 2005 dollars (U.S. Census Bureau, New Mexico Higher Education Department). The CPC impact for this benefit was an 11.2 % gain for completion of high school and is applied to age 20. Lifetime earnings were calculated from age 18 to 65. This estimate assumes that the wage differential between high school graduates and those who drop out will be the same when preschool children reach adulthood. With the high growth rate in earnings as it relates to educational attainment observed in the past this is a conservative estimate of the potential benefits for this variable.

The benefits from higher educational attainment and earnings for preschool participants also translate into higher taxes paid by participants. The marginal tax rate on incomes greater than \$16,000 in New Mexico is 4.9%. This rate was applied to estimate the portion that accrues to the state. Average marginal federal tax rates in New Mexico for income is 26.2% (National Bureau of Economic Research) and the combined employer and employee share for Social Security (FICA) and Medicare is 15.3%. These tax rates were applied to the salary differential earned by high school graduates to obtain the estimates for federal, state and local government benefits associated with increased earnings of participants.

Health Outcomes

By the age of 25 the CPC program participants were found to have experienced lower rates of teen pregnancy, the observed impact was $-.019$, relative to those in the comparison group. Data was obtained from Hoffman, 2006 that estimates the annual lost tax revenue from income and sales taxes of mothers and fathers resulting from teen pregnancy. The estimated lost revenue for taxes on earnings per parent was estimated. 10% was estimated to accrue to local and state government and the residual was applied to the federal government. We assumed that differences in earnings and taxes would last for 5 years. This is a conservative estimate and assumes that the first 5 years when the child is youngest has the most significant effect on taxes due to decreased labor force participation.

The Chicago CPC impact for tobacco use was $-.042$ or a decrease in tobacco use by participants of about 4%. About 42,000 New Mexicans are living with at least one tobacco-related illness. Tobacco costs the State \$757 million annually in medical costs and lost productivity (New Mexico Tobacco Survey, 2002). The average cost of each tobacco related illness was estimated using these data. The cost estimate also includes the cost of cigarettes. The underlying assumption is that the smoker smokes a half pack of cigarettes per day and the retail price per pack in New Mexico is \$3.98 (Health Impact of Tobacco, 2005). The health benefits from reducing tobacco use are estimated to accrue to local and state government. The benefits from reducing the purchase of cigarettes were attributed to the participants. The benefit was applied to age 24.

The estimated impact of the CPC program on private health insurance was $.038$ at age 25. The value of individual market single health insurance coverage was estimated from the New Mexico estimate contained in the report: 2006 Health Insurance: Overview and Economic Impact in the States. This value was \$1,982 per year. This is a conservative estimate since health insurance coverage in the U.S. is usually employer-based and often applies to the entire family not just the individual. This benefit was estimated for the working life of participants and was estimated as accruing to the participants.

Other Potential Benefits That Were Omitted From the Analyses

Increased earnings for participant's parents. The benefits that are included in our study do not include all of the potential dollar benefits that are generated from investing in high quality preschool services. One example of a benefit that is omitted is the earnings that may be gained by parents of the preschool children who participate. The Abecedarian program evaluation did show that the education level, earnings and occupation level of the mothers in the preschool group did improve and that this benefit continued after their children left the preschool program (Masse and Barnett, 2002). While these intergenerational benefits are omitted from the estimates in this report they were estimated in a benefit-cost study of the Abecedarian preschool program and were estimated to total nearly \$74,000 in 2002 dollars over the life of the mothers. There are additional tax gains to the government that would be in addition to the earnings gains. While the State-funded Pre-K Program in New Mexico is less intensive than the full day program provided by the Abecedarian Program some of those benefits would be expected to accrue in a half-day

program as well. It also shows the potential benefits from effectively integrating the New Mexico State-funded Pre-K Program with other preschool and support services for families, such as those currently provided through CYFD, PED and Head Start.

Benefits associated with higher educational attainment. Other intergenerational positive effects of higher educational attainment may be expected to occur. The children of preschool participants may be expected to increase their educational attainment because their parents have better educational and life outcomes. They may also have better health outcomes such as reduced teenage pregnancy or tobacco use, as some of their parents who attended the preschool program achieved. Some of these benefits were estimated in other cost-benefit studies of preschool such as Masse and Barnett (2002) which estimated several of the intergenerational benefits of the Abecedarian project. Aos (2004) conducted a benefit-cost analysis where additional non-wage benefits were estimated at 25% of the earnings benefits for participants. Such benefits were omitted from the current analysis which applies more conservative intergenerational assumptions.

Intangible victim costs. As mentioned in the benefit description for victim costs the intangible costs to victims of child abuse and neglect and to victims of crime were omitted from this analysis. Some authors estimate that the intangible costs are significantly greater than the tangible losses that occur. For child abuse and neglect Miller, Cohen and Wiersema (1996) estimated that intangible costs were 8 times greater than tangible costs to victims. Karoly and Bigelow (2005) estimated that the intangible victim cost of juvenile crime is about 1.4 times the tangible cost. Including these benefits could significantly increase the total benefits from reducing these events and the total benefits associated with the New Mexico State-funded Pre-K Program.

Benefit-Cost Estimates Under the Baseline Assumptions

This section shows the benefit-cost analysis of the New Mexico State-funded Pre-K Program. For all of the analysis we assume a 3% discount rate. In this section the results from applying the baseline assumptions are described. The baseline assumptions are those described in Table 6 and discussed earlier in the report. The costs and benefits are discounted to age 4 and extend between the ages of 4 and 65 depending on when the benefit occurred with some benefits extending as far as age 65.

Table 11 shows the costs and benefits from investing in the New Mexico State-Funded Pre-K Program with 70% participation and applying the baseline assumptions about the distribution of benefits to participants based on risk and preschool participation rates. The left-hand column of the table shows the source of cost or benefits. It includes the New Mexico State-funded Pre-K Program cost and the benefits (or in some cases negative benefits or costs) associated with each of the program's impact. Each column in the table shows to whom the cost or benefit accrues. These columns show the distribution of costs and benefits to different sectors of society—local, state and federal government, Pre-K Program participants, and the rest of society. The last two columns show the total cost and benefit to New Mexico and for the U.S. as a whole. The New

Table 11

Present Value Costs and Benefits for the New Mexico State-Funded Pre-K Program (in 2005 dollars per child)

Source of Costs and Benefits	Government			Participants	Rest of Society	Total Society	
	State/Local	Federal	Total			NM	Total U.S.
Program Costs	-2,961	---	-2,961	---	----	-2,961	-2,961
Program Benefits							
Education outcomes							
Grade retention (by age 19)	218	---	218	---	----	218	218
Special education (by age 12)	1,138	285	1,423	---	----	1,138	1,423
Educational attainment (by age 19)	-467	---	-467	---	----	-467	-467
Child welfare outcomes (by age 10)							
Child welfare system costs	59	76	135	---	---	59	135
Costs to victims of abuse and neglect	---	---	---	55	---	55	55
Juvenile crime outcomes (by age 14)							
Justice system costs	970	---	970	---	---	970	970
Costs to victims	---	---	---	---	861	861	861
Value of child care (by age 5)	---	---	----	2,272	---	2,272	2,272
College attendance (by age 19)	-103	---	-103	-10	---	-113	-113
Adult Crime (by age 24)							
Justice system costs	455	---	455	---	----	455	455
Costs to victims	---	---	---	---	477	477	477
Labor market earnings (by age 20)							
Net earnings/compensation	---	---	---	7,408	---	7,408	7,408
Taxes on earnings	363	3,074	3,437	----	---	363	3,437
Health (by age 24)							
Had child when aged < 18 y, females	2	22	24	---	---	2	24
Daily tobacco use	153	---	153	277	----	430	430
Private health insurance	----	----	----	683	---	683	683
Total benefits	2,788	3,457	6,245	10,685	1,338	14,811	18,268
Net benefits	-173	3,457	3,284	10,685	1,338	11,850	15,307
Benefit-cost ratio (\$/1\$)	0.94	---	2.11	---	---	5.00	6.17
Internal rate of return (%)	-0.1%	---	7.5%	---	---	18.1%	22.3%

Mexico total is a summation of the costs and benefits that accrue to state and local government, to participants and to the rest of society (assumed to be New Mexico society since it is primarily benefits that accrue to victims from reduced juvenile and adult crimes). The Total U.S. column is a summation of the federal government costs and benefits.

Each of the rows of Table 11 shows the value of the cost and benefit associated with each outcome and distributed over the different sectors. The first row shows the estimated cost of the New Mexico State-funded Pre-K Program which is \$2,961. This cost estimate is lower than it would be without other current local, state and federal preschool funding and services that exist independent of the addition of the New Mexico State-funded Pre-K Program funding and services. Just as the cost of the Pre-K effort is expected to be lower because of the existing base of preschool resources so are the benefits. The benefits that are attributed to New Mexico's State-funded Pre-K Program are shown in the table and are discounted based on the assumption that some of the children in the State-funded Pre-K Program would have been served by other preschool programs. The last four rows provide a summary of the costs and benefits associated with the State-funded Pre-K Program. The row described as total benefits sums all of the Program Benefits that are shown. Net Benefits is the sum of total benefits minus program costs. The benefit-cost ratio is calculated by dividing the total benefits by the total cost of the program. Finally, the internal rate of return shows the annualized, compounded return rate which is earned on the investment in the Pre-K Program. The internal rate of return adjusts for the timing of the benefits that are generated. If two programs result in the same net present value but one program's benefits are generated at an earlier age for the participants than the other program then that program will have a higher internal rate of return.

Some of the numbers in Table 11 show that there are initial increased expenditures for K-12 education and college attendance. These are negative benefits attributable to the Pre-K Program. However, the increase in educational attainment of participants improves a variety of long-term life outcomes that produce benefits for government, for participants and for society as a whole. The net effect of the preschool program is very positive. The first column of cost and benefit data shows that nearly every dollar invested by the state of New Mexico is returned to the state by reducing the costs associated with special education services, grade retention, child welfare, the justice system, teenage pregnancy, tobacco use and increasing state and local taxes through increased participant earnings. While state and local government invest in many services for which they do not anticipate a net benefit in this case the investment pays for itself. It is important to remember that these estimates applied a 3% discount rate to the future benefits and if the costs and benefits were discounted at a slightly lower rate than the benefits would exceed the costs, even for local and state government. Also, as discussed in the benefit section of this report there are many dollar and non-dollar benefits that can be expected from improved educational attainment of participants and their families that are not included in the analysis.

The return to the state of New Mexico, taking into account participants and society as a whole as well as state and local government shows that there \$5 is returned to New Mexico for every dollar that the state spends on the New Mexico State-funded Pre-K Program. The internal rate of return for New Mexico, at over 18%, shows that state-funded Pre-K services are a very good investment of state resources. In addition, the return increases when the benefits to the federal government and U.S. taxpayers are considered. The overall benefit-cost ratio for all of society is

approximately \$6.17 and the internal rate of return on this investment, given the baseline assumptions of the model, is 22.3%.

Figure 2 graphs the present value costs and benefits attributable to the New Mexico State-Funded Pre-K Program that were described in Table 11. The blue bars show the costs and benefits to New Mexico while the red ones show those for the rest of the United States. The size of the bars reflects the size of the cost and benefit. Public education is the sum of “educational attainment and government cost of college attendance; justice system is the sum of “juvenile crime justice system cost” and “adult crime justice system cost.” Net earnings is the sum of “net earnings” and participant’s cost of “college attendance” and participants benefits from reducing their “daily tobacco use.” The bar labeled crime and abuse victims is the sum of “costs to victims of abuse and neglect” related to reduced child welfare incidents and “costs to victims,” which is related to reductions in adult and juvenile crimes committed. Health is the sum of “had child when aged <18 years,” non-participant benefits from “daily tobacco use” and “health insurance.”

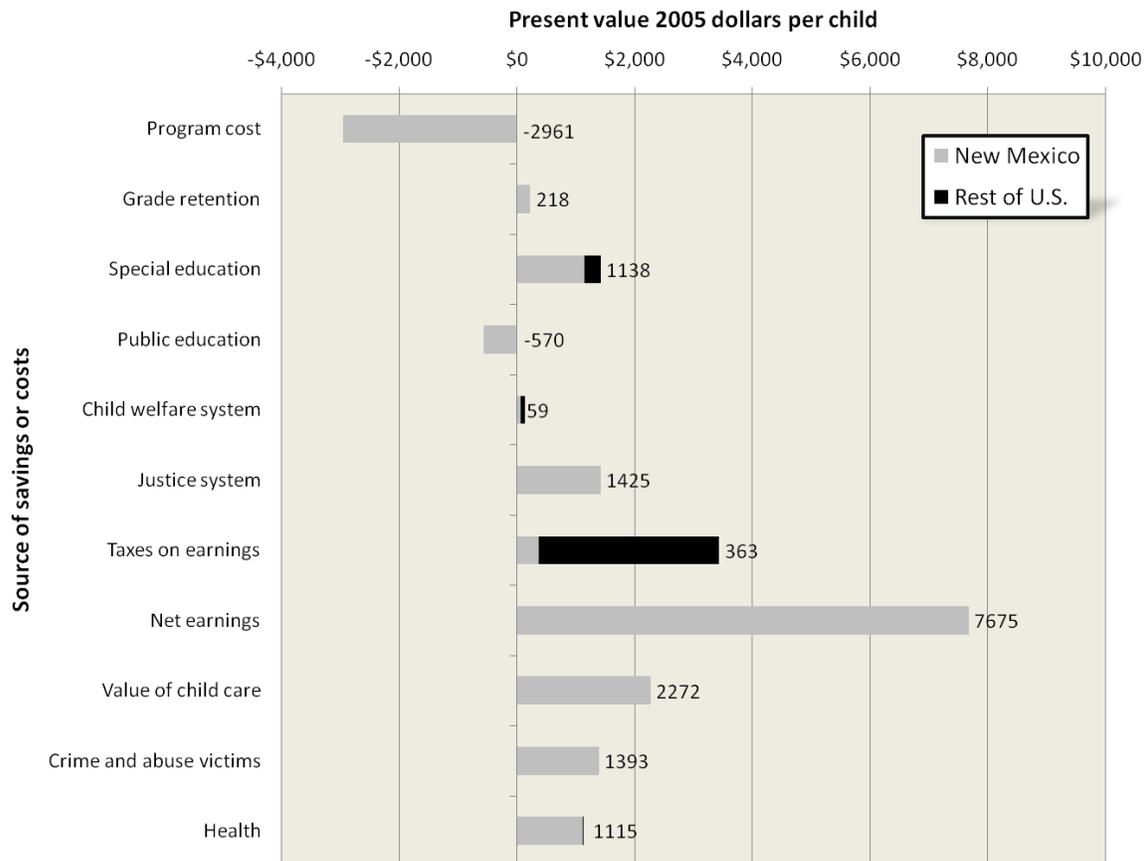


Figure 2. Present value costs and benefits attributable to the New Mexico State-funded Pre-K Program.

SOURCE: Cost-benefit table (32).

NOTES: All amounts are per child in 2005 dollars and are the present value of amounts over time where future values are discounted to age 4 of the participating child, using a 3 percent annual real discount rate. New Mexico values exclude benefits/costs to the federal government. Numbers may not add because of rounding.

Taxes on future earnings of participants is the largest benefit to the U.S. government and earnings to participants are the largest benefit overall. Child care is also a significant benefit in these estimates. The most significant educational benefit is from reduced expenditure on special education services and most of this benefit accrues to New Mexico state and local government.

The pie chart in Figure 3 shows a slightly different picture of those benefits. It gives the relative distribution of each area of benefit out of the total present value benefits estimated in the baseline model for New Mexico society. Benefits and costs to the federal government are excluded for each outcome shown in this chart. In this figure education system reflects the sum of “grade retention”, “special education” and “public education” costs and benefits in New Mexico. Justice system is the sum of “juvenile crime justice system cost” and “adult crime justice system cost”. Net earnings were estimated by taking the sum of “net earnings” and participant cost of “college attendance” and participant benefits of “daily tobacco use.” For the variable, Crime and abuse victims we added the “costs to victims of abuse and neglect” under child welfare outcomes and “costs to victims” under juvenile crime outcomes and adult crime outcomes. Health is the sum of “had child when aged <18 years,” “daily tobacco use,” and “health insurance” benefits.

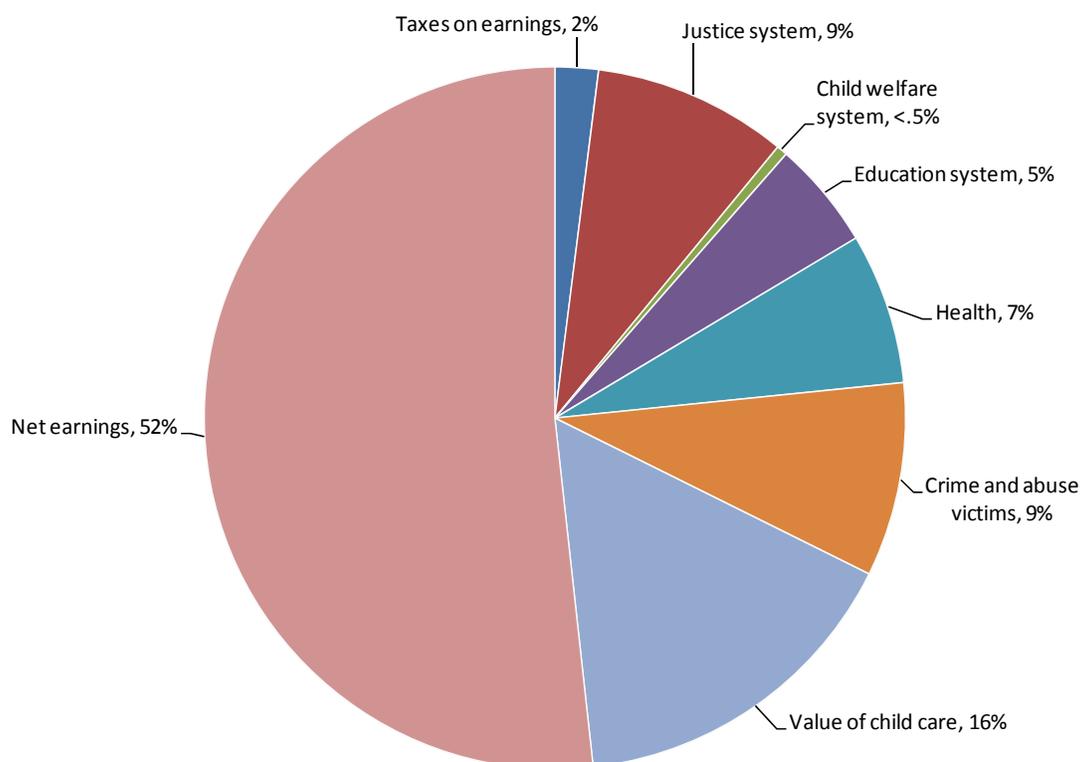


Figure 3: Distribution of Present Value Benefits for New Mexico Society in the Baseline Model.

SOURCE: Cost-benefit table (32).

NOTES: The percentage distribution is per child based on 2005 dollars. The dollars are the present value of amounts over time where future values are discounted to age 4 of the participating child, using a 3% annual real discount rate. New Mexico values exclude benefits/costs to the federal government. Numbers may not add because of rounding.

This figure illustrates that the majority of benefits from the New Mexico State-Funded Pre-K Program accrue to the participants through increased earnings as adults and because of the value of the child care that was provided. However, there are significant benefits to other sectors in New Mexico. Taxpayers receive about 20% of the total benefit—these include the taxes, justice, child welfare and educational system cost savings as well as some of the reduced expenditures for health care associated with teenage pregnancy and tobacco use.

The data in Table 12 show the benefits and costs to New Mexico and to society when the dollars are aggregated for one cohort of children served by the New Mexico State Pre-K Program. We assume that there will be a total of 30,000 4-year-old children in New Mexico and all are eligible to enroll in the State-funded Pre-K Program. The 70% participation rate suggests that approximately 21,000 will actually enroll in the program. The estimates in Table 12 show the total net present value cost and benefit from serving one cohort of 21,000 children. The total dollars for New Mexico are shown in column 3 and those for the U.S. as a whole are given in the

Table 12

Present Value Costs and Benefits for Universal Preschool in New Mexico in the Baseline Model (in dollars per child and dollars per cohort of 4-year-olds)

Source of Costs or Benefits	Benefits (Costs) to Society New Mexico Only		Benefits (Costs) to Society U.S. Total	
	Dollars Per Child	Dollars Per Cohort (thousands)	Dollars Per Child	Dollars Per Cohort (Thousands)
Program costs	-2,961	-62,181	-2,961	-62,181
Program benefits				
Education outcomes	889	18,669	1,174	24,654
Child welfare outcomes	114	2,394	190	3,990
Juvenile crime outcomes	1,831	38,451	1,831	38,451
Value of child care	2,272	47,712	2,272	47,712
College attendance	-113	-2,373	-113	-2,373
Adult crime outcome	932	19,572	932	19,572
Labor market earnings	7,771	163,191	10,845	227,745
Health	1,115	23,415	1,137	23,877
Total benefits	14,811	311,031	18,268	383,628
Net benefits	11,850	248,850	15,307	321,447
Benefit-Cost Ratio (\$/\$1)		5.00		6.17
Internal Rate of Return (%)		18.1%		22.3%

SOURCE: Authors' calculations based on cost-benefit table (32).

Notes: all amounts are in 2005 dollars and the present value of amounts over time where future values are discounted to age 4 of the participating child, using a 3 percent annual real discount rate. Dollars-per-cohort figures assume a cohort of 30,000 4-year-olds and a 70 percent preschool participation rate. Numbers may not add because of rounding.

last column. These numbers show that the total cost of serving one full cohort of 4-year-old children is approximately \$62.18 million dollars. The total (gross) benefit that accrues to New Mexico from this cohort is just over \$311 million dollars and the total net gain to New Mexico is nearly \$249 million dollars per year. The last column shows slightly higher net gains since the program costs do not change and the benefits to the U.S. are positive. The total net gain from serving one cohort is estimated to be valued at just under \$321.5 million dollars per year. The other numbers in the table are the same as those shown in Table 11, which focused on the average cost, benefits and net present value per child served.

Benefit-Cost Results With Alternative Benefit Distribution Assumptions

Additional estimates were done using assumptions about the distribution of benefits to participants. The baseline assumptions are shown in Table 13 along with the alternative distribution used in the sensitivity analysis. The baseline and alternative assumptions are identical to those used by Karoly and Bigelow (2005). The baseline assumptions applied all of the benefits observed in the Chicago CPC program to high risk students who received no preschool prior to the implementation of the New Mexico State-Funded Pre-K Program and 50% of the benefit to those high risk students who would have attended a different public preschool program. Under the baseline assumption some of the benefits would apply to medium and low risk participants depending on their preschool services. The alternative Distribution 1 is the least conservative assumption that we apply to the benefits. In this distribution, only high-risk children are assumed to benefit and that benefit is discounted to 50% for high risk children who would have attended a different public preschool program and 0% for low risk children who would have attended a private preschool program. The weighted benefit in this situation is .195 compared to .2625 in the baseline model. Alternative distribution 4 shows the least conservative assumptions applied in this analysis. In this distribution the percentage of benefits for each group by risk factor and by preschool attendance is increased. The only group that is assumed to receive no benefit from attending the New Mexico State-funded Pre-K Program under distribution 4 is low risk participants who would have attended private preschool programs in the absence of the State-funded Pre-K Program.

Figure 4 summarizes the results of applying these alternative assumptions to the data. The bar chart displays the net present value of benefits per child in red for each alternative distribution. The baseline results are shown in the middle of this graph and are identical to those shown in earlier Tables 11 and 12 in the previous section. The far left and right ends of the graph show the results from applying the most and least conservative assumptions to the model.

The net present value result as estimated for New Mexico is shown on the red bar chart and is graphed on the left-hand axis. The most conservative assumptions show a net present value benefit to New Mexico of \$8,803 per child compared with the baseline result of \$11,850 per child and the least conservative net present value result of \$24,941 per child.

Table 13

Alternative Assumptions Regarding the Distribution of Benefits by Alternative Preschool Types at Baseline and Risk Status

Type of preschool universal program participants would have attended at baseline	High risk	Medium risk	Low risk
<i>a. Baseline assumption</i>			
Percentage of full CPC benefits			
None	100	50	25
Public	50	25	0
Private	0	0	0
<i>b. Alternative distribution 1 (most conservative)</i>			
Percentage of full CPC benefits			
None	100	0	0
Public	50	0	0
Private	0	0	0
<i>c. Alternative distribution 2 (more conservative)</i>			
Percentage of full CPC benefits			
None	100	50	0
Public	50	25	0
Private	0	0	0
<i>d. Alternative distribution 3 (less conservative)</i>			
Percentage of full CPC benefits			
None	100	70	35
Public	70	35	0
Private	0	0	0
<i>e. Alternative distribution 4 (least conservative)</i>			
Percentage of full CPC benefits			
None	100	50	25
Public	100	50	25
Private	50	25	0

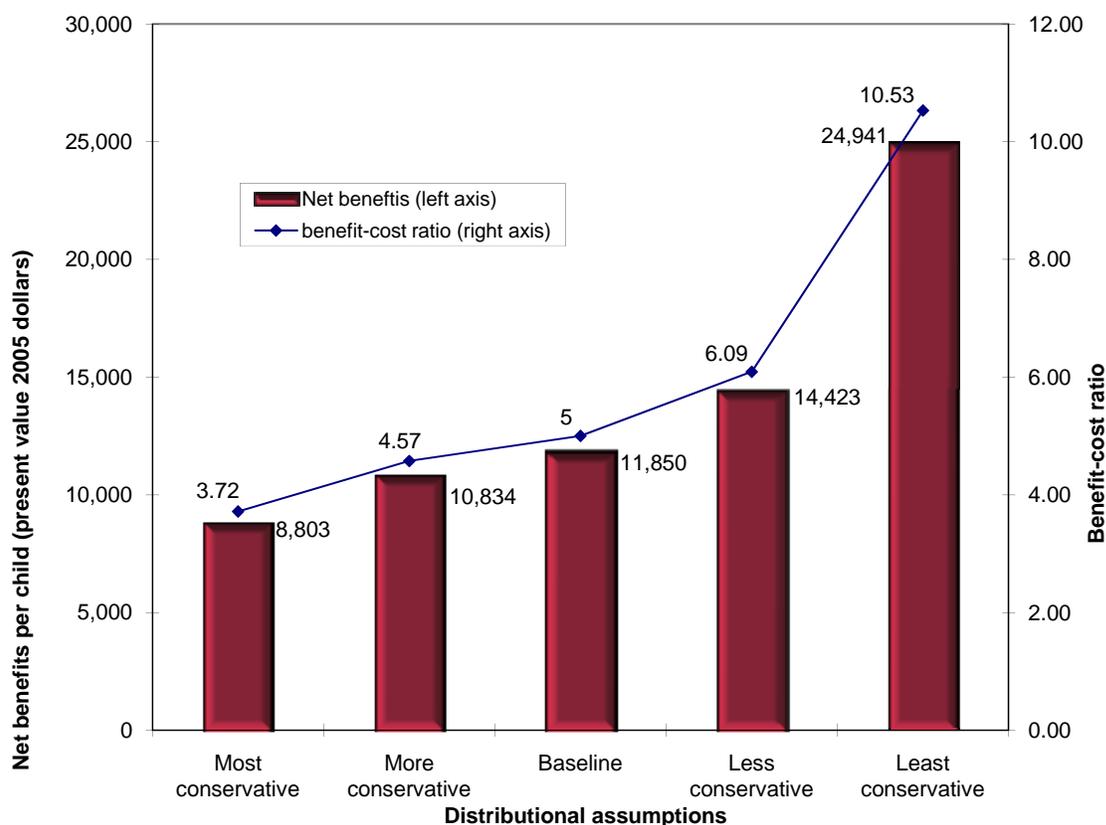


Figure 4: Benefit-cost results for New Mexico Society with alternative distributional assumptions.

SOURCE: Table 2.5

NOTES: Net benefits are per child in 2005 dollars and are based on the present value of amounts over time where future values are discounted to age 4 of the participating child, using a 3% annual real discount rate. New Mexico values exclude benefits/costs to the federal government.

Calculation:

Take the most conservative situation, for example, according to table 3.5 and table 2.8, the weighted benefit coefficient (0.2625 in baseline) is 0.195.

Net benefit: $11156 \text{ (baseline)} / 0.2625 * 0.195 = 8,287$

Total benefit: $14,117 \text{ (baseline)} / 0.2625 * 0.195 = \$10,487$ (not shown in the figure)

Benefit-cost ratio: $10,487 / 2961 = 3.53$

The figure also shows the impact of applying these alternative assumptions on the benefit cost ratio. The benefit cost ratio is shown on the right-hand axis and is shown as a line graph in the figure. The baseline benefit-cost ratio is in the middle and remains at \$5 in benefits to New Mexico for every \$1 spent on the New Mexico State-Funded Pre-K Program. If we assume no benefits are derived from the program for low and medium risk groups then the benefit cost ratio

for New Mexico is \$3.72 and if we assume a higher percent of the benefit accrues to all of the groups in Table 6 then the benefit-cost ratio increases to a high of \$10.53 for every dollar spent on the New Mexico State-Funded Pre-K Program.

Conclusions

The findings in this report show strong support for the State-funded Pre-K Program that has been initiated in the State of New Mexico. There are good economic reasons to invest in this program and the children that it serves. The key findings of this study include:

1. Delivering high quality preschool services as described in the New Mexico service guidelines developed in collaboration among New Mexico Public Education Department, Children, Youth and Families Department, the Governor's Office and the Department of Finance and Administration the net present value to society of a one year high quality preschool program in New Mexico is \$15,307.
2. New Mexico's State-Funded Pre-K Program generates \$11,850 in net present value benefits to New Mexico society (i.e., New Mexico participants and taxpayers), for each annual cohort of children served assuming that 70% of those eligible participate in the program.
3. For every dollar spent on New Mexico State-Funded Pre-K services we estimate, using the baseline assumptions, that there will be \$6.17 per child in benefits generated from the program. Five dollars in benefits is generated to New Mexico for every dollar invested in the NM State Pre-K Program.
4. Even the most conservative assumptions used in the analysis showed positive net benefits from investing in New Mexico State-Funded Pre-K services. The estimates of benefits vary depending on the amount of benefit that we assume accrues to children with different risk factors and different preschool experience. The range of benefit estimates show that the most conservative assumptions result in \$3.72 benefit per dollar invested to as much as \$10.53 per dollar invested in State-funded Pre-K services based on less conservative assumptions.
5. The benefit estimates are necessarily incomplete since they only include benefits that are measured in dollars and omit intangible benefits that are attributable to the program. For example, benefits from reducing child abuse and neglect omit many of the intangible benefits from improved child well-being of participants. They also omit many benefits that accrue to the next generation of children born to participants and to the participants' parents.

These findings show that the benefits, under the most conservative assumptions, can be documented as positive and significant. There are net benefits under all of the different assumptions in our model and without accounting for non-dollar benefits and benefits that may accrue beyond the age and participant assumptions of the study.

Findings, similar to those presented in this report for New Mexico, have been documented in other states. Such findings have resulted in growing support for state-funded preschool programs throughout the United States. The impetus for this expansion of state efforts is in part due to the

compelling case that pre-kindergarten services are a sound public investment. There is a large body of high-quality economic research that concludes that there are many positive, quantifiable dollar benefits from investing in children during their preschool years. The findings in this report reveal the benefits to New Mexico from expanded investments in the State Pre-K Program. The benefits that are identified for New Mexico, based on the unique demographic characteristics of New Mexico's citizens and cost data that is specific to New Mexico make a compelling case for New Mexico to make State-funded Pre-K services available to all 4 year old children.



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