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## What is the Cost of a Preschool Program?

### Abstract

State and local governments that wish to establish or improve preschool programs need cost estimates to evaluate the magnitude of appropriations required. Yet even a casual scrutiny of available expenditure data reveals an enormous variance between the most expensive and least expensive preschool provisions. The purpose of this paper is to delineate the root causes of differences in per-student costs of states' preschool programs and to suggest cost tradeoffs as different features such as smaller class size or longer school days are introduced or substituted for each other. These cost findings are contrasted with recent meta-analyses of the effectiveness of different program provisions. The goal of this paper is to advance the still nascent body of research on preschool cost effectiveness, and to aid state or local governments to assess the mix of characteristics that are most effective for any given budget constraint. The paper builds partially on the authors' previous analysis of international preschool programs.

### Keywords

early childhood

### Disciplines

Economics | Educational Assessment, Evaluation, and Research | Education Economics

**What is the cost of a preschool program?**

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*Abstract*

State and local governments that wish to establish or improve preschool programs need cost estimates to evaluate the magnitude of appropriations required. Yet even a casual scrutiny of available expenditure data reveals an enormous variance between the most expensive and least expensive preschool provisions. The purpose of this paper is to delineate the root causes of differences in per-student costs of states' preschool programs and to suggest cost tradeoffs as different features such as smaller class size or longer school days are introduced or substituted for each other. These cost findings are contrasted with recent meta-analyses of the effectiveness of different program provisions. The goal of this paper is to advance the still nascent body of research on preschool cost effectiveness, and to aid state or local governments to assess the mix of characteristics that are most effective for any given budget constraint. The paper builds partially on the authors' previous analysis of international preschool programs.

## INTRODUCTION

High quality preschool programs have shown lasting benefits in preparing the young for school success and as well as subsequent adult success.<sup>1</sup> This message has caught on, and in addition to the federal program, Head Start, 38 states sponsor some form of preschool programming with a 20 % increase in enrollment from 2001 to 2004.<sup>2</sup> Few states have made a commitment to universal availability of Pre-Kindergarten (Pre-K) availability, although Oklahoma and Georgia are leaders in this movement. As states and other governmental units move forward in considering expanding their Pre-K offerings, they face the challenge of understanding the costs of such an obligation. Yet, the large variance in arrangements for offering Pre-K in terms of specific provisions and features has generated a very large variance in costs. The purpose of this paper is to examine the extent of cost differences, the reasons for such differences, and their relation to quality of program as well as to consider how both costs and quality can be taken account of when planning Pre-K programs.

In what follows, we first explore per-student cost differences in Pre-K education among the states and their relation to quality measures. We then review the reasons that different programs vary so significantly in costs. Finally, we suggest the development of a cost methodology that permits decision-makers to combine Pre-K program planning with cost analysis and determination.<sup>3</sup>

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<sup>1</sup> Belfield, C., Nores M., Barnett W.S., and Schweinhart L. 2006. The High/Scope Perry Preschool Program, *The Journal of Human Resources* 41(1): 162-190.

<sup>2</sup> National Institute for Early Education Research. 2005. *The State of Preschool: 2005 State Preschool Yearbook*.

<sup>3</sup> The paper builds partially on the authors' previous analysis of international preschool programs: Levin, H., and Schwartz, H., 2006. *Costs of Early Childhood Care and Education Programs*. Prepared for UNESCO's 2006 Education For All Global Monitoring Report.

## VARIANCE IN PRESCHOOL COSTS

Existing sources of data on preschool programs suggest large differences in per-student costs. These data are subject to serious challenges regarding their accuracy and comparability because they are not based upon a common definition of services or a common accounting system. One of the most comprehensive sources of data on state preschool programs is the National Institute of Early Education Research (NIEER), which publishes yearbooks on both the quality and access to state-funded preschool programs. Their 2005 Yearbook shows that states with preschool programs spent as little as \$721 (Maryland) or as much as \$9,305 (New Jersey) per child.<sup>4</sup>

But, state spending does not capture the full costs of preschool, which are compiled from a variety of sources ranging from federal, state, local public allocations and private sources such as philanthropic contributions and parental fees or in-kind contributions. The National Association of Child Care Resource and Referral Agencies (NACCRRA) recently published its own ranking of the 50 states' regulations and oversight of early childcare. In it, the Association includes average annual cost of preschool, which is a state-level average of providers' self-reported highest fees provided to Research and Referral agencies around the country.<sup>5</sup> To illustrate the difference between the state spending measure and preschool costs, Maryland reported spending \$721 per child on state-funded preschool programs in 2005, but the NACCRRA-reported average annual cost of childcare in Maryland for 2006 was \$7,159.

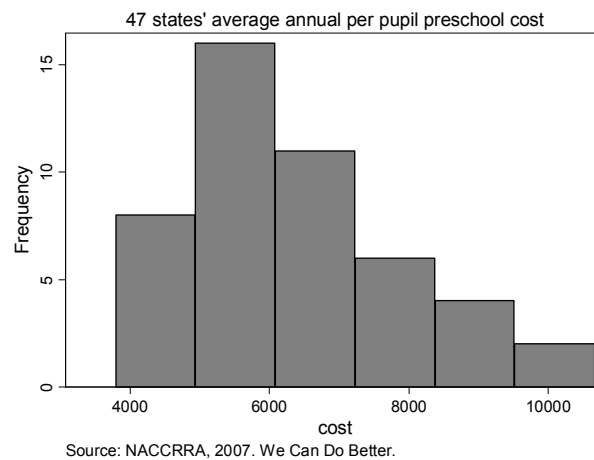
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<sup>4</sup> Ibid.

<sup>5</sup> This data reporting process is described at NACCRRA's website in a document titled "Data Collection for Building Early Learning Systems." The document was accessed on March 13, 2007 at <http://www.naccrra.org/randd/program.php?Page=18>.

NACCRRA reports that the preschool programs cost as little as \$3,794 per child in Mississippi and as much as \$10,668 per child in Massachusetts.<sup>6</sup> The average cost across the 48 states is \$6,582, which is slightly lower than the average Head Start fiscal year 2005 cost of \$7,287 per child.<sup>7</sup> The histogram below shows the distribution of 47 states' average annual costs.<sup>8</sup>

**Figure 1—Distribution of average annual per pupil cost for preschool among states**



What features explain this variation in preschool cost? Absent further information, it is impossible to discern whether cost differences reflect differences in services or quality, whether some providers account for only operating expenses and not capital outlays, or whether fees vary in some way that is unmeasured. These are important determinants of cost that we will discuss in the next section of this paper.

Presumably states for which preschool costs the most would also have the strictest requirements for quality and safety. Both NIEER and NACCRRA offer their own quality

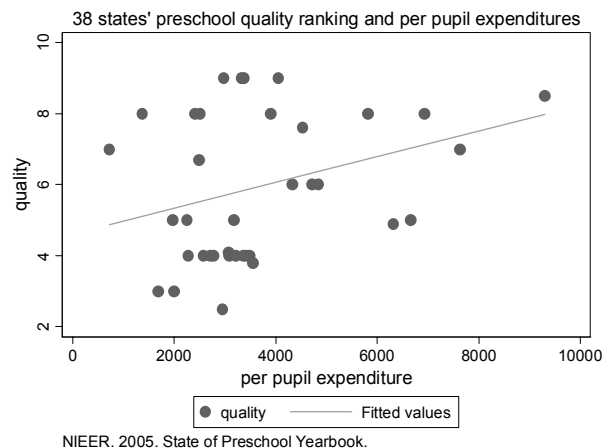
<sup>6</sup> NACCRRA reports the average annual cost of care in New Hampshire was \$15,430, but we believe this to be an anomaly, since it is approximately 50% higher than the second-most expensive state (Massachusetts).

<sup>7</sup> Average Head Start cost is reported on the Health and Human Services website at <http://www.acf.hhs.gov/programs/hsb/research/2006.htm>.

<sup>8</sup> New Hampshire was dropped from this histogram as the state's average per pupil cost of \$15,430 is an outlier.

measures of states’ preschool regulations, which we use to explore the relationship between quality and reported costs. Using a simple OLS regression, we find that states’ per pupil spending for preschool explains only 9% of the variance in NIEER’s quality ratings<sup>9</sup> for the 38 states that have state-funded preschool programs. However, the quality rating is a statistically significant predictor of spending: a 1-point increase on a 10-point quality scale is associated with a \$262 increase in state per pupil expenditures—a 7% increase in spending above the mean expenditure of \$3,700. The relationship between the quality ranking and per pupil spending is shown in Figure 2 below.

**Figure 2—Quality rating and state per pupil expenditures on preschool (NIEER)**



Performing the same exercise using NACCRRRA quality ranking<sup>10</sup> and cost data, we find a similarly positive but weak relationship. The variance in per pupil cost of

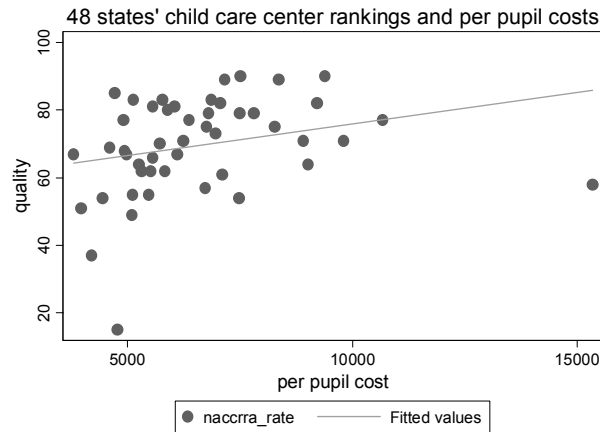
<sup>9</sup> NIEER quality ratings are based upon 2005 data and are a count of how many of the following 10 measures are met: comprehensive program; lead teacher must have a BA or higher; teacher must have specialized training in prek; assistant teacher must have a CDA or more; teachers must partake of annual in-service training of at least 15 hours/year; maximum class size is 20 or less; staff-child ratio is 1:10 or better; vision, hearing, health, and at least one other supportive service is mandated; at least 1 meal per day is served; state or regulatory agency makes site visits to ensure compliance.

<sup>10</sup> NACCRRRA’s quality ratings are based upon 2006 data and are measures of states’ minimum standards for child care centers across 15 items: (1) staff: child ratios (e.g, 1:8 – 1:10 for four year olds); (2) group size (e.g., no more than 16-20 children for four year olds); (3) center directors educational qualifications of BA or higher; (4) teacher educational qualifications of CDA credential or Associate’s degree in early



preschool explains only 7% of the variance in NACCRRRA’s quality ratings, and a 10-point increase on the 150-point quality scale is associated with a \$380 per pupil increase in costs—a 5% increase above the average cost of \$6,600 per pupil. This is shown graphically below.

**Figure 3—Quality rating and per pupil costs of preschool (NACCRRRA)**



Source: NACCRRRA, 2007. We Can Do Better.

To see which components of the quality ranking appear to be most correlated with spending, we compared the five states rated at the top and bottom of both NIEER’s and NACCRRRA ranking systems. Here we find that the relationship between specific quality measures and spending is attenuated, but still follows the positive correlation between quality and per pupil state spending.

Table 1 reports six of the 10 measures NIEER uses in its quality index for the five states at the top and bottom of the NIEER quality scale. Per pupil spending in the lowest rated states overlaps substantially with that of the highest rated states, but the average per

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children education; (5) orientation training for all staff that includes CPR, first aid certification, and other health and safety training; (6) annual training of at least 24 hours for teachers; (7) mandatory criminal background checks for all staff; (8) center program address all of the following 6 child development domains: social, physical, language/literacy; cognitive; emotional; cultural; (9) centers address 10 health and safety requirements (e.g., immunizations, fire evacuation, incident reporting, diapering), including the prohibition of corporal punishment; centers (10) allow parental visits and communicate with parents; (11) state requires centers to be licensed; (12) states inspect child care centers at least 4 times per year; (13) state licensing staff have no more than 50 programs per person; (14) licensing staff have a BA or higher in early childhood education related field; and (15) licensing reports and complaint reports are publicly available online.

pupil spending is approximately \$1,000 more among the top-rated states. Among top-rated states there is little variation in the quality measures; each state required that the lead teacher have at least a bachelor's degree and some form of specialized education in early childhood, that class size be capped at 20 or fewer students, that the staff child ratio not exceed 1:10, and that a range of supportive services are offered including health and parent activities. Among the lowest rated states, teacher qualification requirements remain largely the same, but class size, staff: child ratios, and supportive service requirements erode.

Similarly, Table 2 reveals a cost overlap among the highest- and lowest-rated states on the NACCRRA quality scale. The five lowest rated states are also less likely to cap class sizes and staff child ratios, or to require that child care centers cover a comprehensive set of child development domains. Yet NACCRRA's 150-point scale of 15 quality measures shows that top-rated states rarely adopt comprehensive standards that meet NACCRRA's benchmarks for each age group from infancy through age 5.

While the data presented in the tables suggest a positive relationship between costs and three input areas—capped class size, capped child-staff ratios, and comprehensive services—the pattern is far from conclusive. Since the quality of a program accounts presumably for a major component of costs, this presents an interesting puzzle. Why does NACCRRA's quality ranking, which includes capped class sizes, adult child ratios, teacher credentials, and other state oversight measures that would presumably influence a child care center's expenses, only account for 7% of the variance in statewide average costs? The answer may lie in the gap between monitoring and enforcement of official state regulations and the actual practices of preschools. In some

states, the gap between adopted state regulations (which is what is listed here) and enforcement of those regulations is reputedly large.

**Table 1. Top five and lowest five rated states by NIEER ratings of state preschool program quality**

State	Per pupil spending from state sources (rounded to \$100)	Coverage (% 4 yr olds in state & Head Start programs)	Quality measures required for state preschool program					
			Minimum teacher education of BA	Specialized teacher training required (licensure, CDA degree)	Minimum assistant teacher education must be child-development related	Max class size of 18-20	Staff-child ratio of 1:10 or less	Supportive services include at least vision, hearing, health, and parent involvement activities
<b>TOP FIVE</b>								
Arkansas	\$4,700	43%	✓	✓	✓	✓	✓	✓
Illinois	\$3,000	44%	✓	✓	✗	✓	✓	✓
Alabama	\$3,400	23%	✓	✓	✓	✓	✓	✓
Tennessee	\$3,300	22%	✓	✓	✓	✓	✓	✓
North Carolina	\$4,000	26%	✓	✓	✓	✓	✓	✓
<b>LOWEST FIVE</b>								
Virginia	\$3,400	24%	✓ (public) ✗ (non public)	✓	✗	✓	✓	✓
New York	\$3,500	48%	✓	✓	✓	✓	✓	✗
Kansas	\$1,700	35%	✓	✓	✗	✗	✗	✗
Maine	\$2,000	41%	✓	✓	✗	✗	✗	✗
Pennsylvania	\$3,000	23%	✓ (public) ✗ (non public)	✓	✗	✗	✗	✗

Source: NIEER. The State of Preschool: 2005 State Preschool Workbook

Notes: Nine states—Arizona, California, Colorado, Hawaii, Michigan, Nevada, New Mexico, Texas, Virginia--had a quality ranking of 4. Virginia was chosen at random from among them.

**Legend**  
 ✓ yes ✗ no

**Table 2. Top five and lowest five rated states by NACRRRA ratings of state standards for child care center quality**

State	Average annual cost (rounded to \$100)	Supply (# spaces / total children <5 years old) <sup>1</sup>	Selected quality measures required by state for all child care centers					
			Teacher has Associate's degree in ECE or CDA	Staff have orientation training	Criminal background checks	Group size (16-20 for 4 yr olds)	Staff-child ratio (1:8 -1:10 for 4 yr olds)	Address six developmental domains <sup>2</sup>
<b>TOP FIVE</b>								
New York	\$9,400	19%	½	½	½	½	½	✓
Illinois	\$7,500	41%	½	½	✓	½	½	✓
Washington	\$8,300	30%	½	✓	½	½	½	✓
Maryland	\$7,200	24%	½	½	½	½	½	½
Oklahoma	\$4,700	44%	✗	½	½	½	½	½
<b>LOWEST FIVE</b>								
California	\$7,500	24%	½	½	½	½	½	✗
Kentucky	\$4,000	62%	✗	½	½	✗	✗	½
Nebraska	\$5,100	53%	✗	½	½	✗	½	✗
Louisiana	\$4,200	42%	✗	½	½	✗	✗	✗
Idaho	\$4,800	25%	✗	✗	½	✗	✗	✗

Source: NACRRRA. 2007. *We Can Do Better: NACRRRA's Ranking of State Child Center Standards and Oversight*. Available at <http://www.nacrrra.org/>

<sup>1</sup> Number of spaces from NACRRRA 2007 data; number of children under 5 from U.S. Census Bureau, 2005 American Community Survey.

<sup>2</sup> The six domains NACRRRA sets out are: social, physical, language /literacy; cognitive; emotional; cultural.

**Legend**

✓ yes ✗ no ½ not required for all age groups

## QUALITY AND COSTS

The two rating systems used above address only inputs and processes, not the outcomes of Pre-K. Preschool education has many goals including the acquisition of language, numerical, and conceptual skills, as well as physical, emotional, and social development. A recent meta-analysis summarizes the research on which preschool inputs affect children's subsequent outcomes; Camilli, Vargas, and Ryan<sup>11</sup> expand upon a meta-analysis of 161 early childhood studies conducted between 1960-2000, and find the following about preschool characteristics:

- Teacher-directed instruction as compared to inquiry-based instruction had an immediate impact on children's cognitive outcomes, but this effect lessened over time.
- Small group instruction and individuation had a positive impact on preschooler's cognitive outcomes.
- Children in programs with additional services such as health, nutrition, parental training and involvement did not do as well as children in programs without these services. It is hard to know if additional services took time or resources away from other needed inputs or there were systematic differences between the children's groups.

These findings roughly comport with the patterns that emerge from NIEER's and NACCRRRA's quality and cost data: variance in class sizes, adult child ratios, and additional services comprise the largest difference between top and lowest-rated states, where the highest rated states' preschooling tends to be more expensive. What is clear,

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<sup>11</sup> Camilli, G., Vargas, S., & Ryan, S. forthcoming. *A Meta-Analysis of the Effects of Early Education Intervention on Cognitive and Social Development*. NIEER and Rutgers, the State University of New Jersey.

though, is that we know very little about the general relation between cost and quality or the contributions that specific cost elements make to specific preschool outcomes.

## **DETERMINANTS OF COSTS**

One reason preschool costs are so little understood is that preschool is far from a homogeneous good. In general, there are two major categories that determine costs: the extent of provision (i.e., enrollments and length of session) and the quality of the program.

### **Extent of provision**

Preschool sessions can vary from only a few hours to as long as twelve hours per day. The difference between a three or four hour session and a twelve hour one will have profound implications for costs, with the longer sessions costing up to three times as much in personnel. The length of session also has important implications for eligibility for services. If preschool is only available a few hours per day, it may mean that full-time working parents must arrange for alternate services to cover some of the time they are at work. Likewise, full-day services may have the effect of discouraging use by part-time working parents or parents who only wish to enroll their child for a few hours each day. This same logic extends to the number of days per week and year that preschool is available.

Enrollments are another measure of the extent of preschool provision. They depend upon the eligibility requirements of early childhood programs and accessibility to the child care centers. Both the covered age ranges for preschool and family eligibility requirements are important determinants of enrollments. Of particular importance is the age provision, with some preschool programs service a wider age range than others.

Eligibility is also determined by the inclusive nature of the services. Some programs are restricted to particular groups defined by income level, region, or need; others are universal (such as in Oklahoma) in extending eligibility to the overall population of children in the covered age groups. Further, the demographic concentration of eligible children in a given population will affect enrollments. These provisions account for large potential differences in enrollments and consequent overall costs. An additional cost factor is that of education of special needs students. Some states require that providers accept students with physical or mental disabilities. Such students require closer assistance and greater services than non-handicapped students, so their inclusion can increase costs substantially.

Finally, accessibility is an important determinant of cost. Unless child care centers are placed conveniently in every neighborhood, there may be difficulties of access, especially in rural areas where sparse populations make it difficult to obtain even minimal provision of centers. Even in urban areas there may be uneven access because of inadequate transportation for some families. This in turn impacts enrollment levels, with obvious consequences for cost.

### **Quality of services**

Costs depend heavily on quality of services. Although there are several different measures to assess quality of child care and early education, they generally employ two major categories for assessment: structure and classroom process.<sup>12</sup> We focus first on four structural elements and then more generally summarize classroom process measures.

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<sup>12</sup> Janet Currie. 2001. Early Childhood Education Programs. *Journal of Economic Perspectives* 15 (2): 213-238.



Structural measures of ECCE can be divided into the following four categories: (1) personnel ratios; (2) qualifications of personnel; (3) facilities and transportation; and (4) auxiliary services -- health and nutrition.

#### *Personnel ratios*

A key feature determining costs is the ratio of adult personnel to children. Most of the top rated preschool programs according the NIEER and NACCRRA indexes require a ratio of at least 1 adult to 10 children (for children aged four). Designated personnel ratios are higher with younger children such as toddlers who need more scrutiny. Since personnel usually dominate the overall costs of preschool, differences in personal ratios heavily influence overall costs. The adult to child ratio is generally considered to be one of the key indicators of quality since it is presumed that with more personnel, more services can be provided and more attentive care given. With low ratios of personnel to children, preschool becomes more limited to childcare, maintenance, and safety issues. Consistent with the findings from Camilli, Vargas, and Ryan, with more personnel it is possible to increase the teaching and educational function of preschool.<sup>13</sup>

#### *Qualifications of personnel and range of services*

Clearly the qualifications of personnel are a key element in the quality of preschool programs. While Table 1 shows little variation among top and bottom rated state-funded preschool programs in terms of teacher education requirements, the NACCRRA ratings of all types of child care centers (not just state-funded preschools) reveals great variation in teacher educational requirements (see Table 2).

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<sup>13</sup> Camilli, G., Vargas, S., & Ryan, S. forthcoming. *A Meta-Analysis of the Effects of Early Education Intervention on Cognitive and Social Development*. NIEER and Rutgers, the State University of New Jersey.

Personnel qualifications are also considered an important determinant of quality of care and education for preschoolers. Presumably those with specialized training in early childhood education or strong teacher preparation are superior in their teaching ability and are able to make a larger educational contribution. The higher the qualifications in market-based economies, the higher will be the salaries for more educated and capable staff. This means that superior qualifications of personnel will have profound effects on overall costs of preschool, even though they are expected to have a corresponding positive effect on quality and outcomes. Finally, the number of staff with full-time responsibilities and with full credentials rather than part-time or with lower educational attainments such as assistants will also have an important impact on costs.

Along with the ratio of personnel to children and their qualifications, the variety of services and composition of needed personnel can have an important impact on costs. Some states require comprehensive services including parental training, adult job training referrals, and health services to children attending the preschool. Some programs also include teachers who visit homes to work with parents to improve their parenting practices. These added services require additional personnel beyond those needed for child care and education of children. Costs may also vary considerably among geographical regions in response to the relative supply and demand of persons with appropriate skills and credentials.

#### *Facilities and transportation*

Costs are also influenced heavily by the characteristics of the preschool facilities, their size, and the provision of transportation. Safety requirements, square footage requirements, and classroom amenities all affect the costs of the preschool. Rooms are

allocated not only for play, rest, teaching activities, and food preparation, but also for testing, counseling, and special educational needs. In addition, bathrooms are specially designed with appliances that are accessible to children and bathing facilities in case the children get unusually dirty. Offices for administrative and teaching personnel and for family conferences are also common. It is clear that the types of facilities provided can vary considerably in cost and cost per child.

The costs of any given facility may be largely fixed regardless of whether it operates at capacity or not. In other words, if only 50 children are enrolled in a facility that has a capacity for 100, the facility cost per child may be almost twice as high as if there is a full complement of children, although some downward adjustment in cost is possible by reducing staffing. In the case of a fully staffed center, the only marginal or additional costs per child are for supplies and food, and these are very low in comparison with personnel and facility costs. In some cases it may be feasible to create larger enrollments at a single facility through providing transportation. But, transportation has its own cost and is not feasible in many areas where residences are at a great distance from the center since transportation is often viewed as inappropriate for very young children.

#### *Auxiliary Services – health, nutrition, parent services*

Inclusion of health or nutrition services increases the cost of preschool. The extent of provision (e.g., immunizations and physicals, number of meals per day, dental services, etc.), location of services (home visits versus center-based care), and extent of parental instruction are important determinants of cost. The Head Start program for economically-disadvantaged children arranges for comprehensive health and nutrition

services. Head Start staff interview parents to determine whether the child has access to health services. If not, staff are expected to assist the parents to gain access to public and private agencies to enroll the children in local health insurance and services. Specifically, staff are expected to educate parents about the importance of health care prevention services and their child's eligibility for Medicaid, make sure parents arrange health care appointments for their children, help arrange transportation for those families to attend the appointments, and provide other relevant support. Within 90 days of enrollment, Head Start staff are expected to screen children to identify those who need referrals to formal assessments for services such as vision, hearing aids, mental health services, special education, or other related services. Head Start agencies commonly arrange for a local health service provider to come to the preschool to provide immunizations or physical and dental examinations to children.<sup>14</sup>

Few states require non-Head Start child care centers to offer the same level of health and nutritional services, but many state-funded preschool programs mandate that vision, hearing, and health services be provided to children as well as referrals to government or charitable agencies that provide health screening and care. Clearly the array of supportive services provided impact overall cost.

### **Classroom process measures**

As compared to structural costs such as staff ratios, staff qualifications, and range of services provided, classroom process measures examine the actual practices within the classroom. A standard methodology to assess these practices for 3-5 year olds is the Early

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<sup>14</sup> Office of Human Development Services. (No date). Available at <http://www.acf.hhs.gov/programs/hsb/programs/index.htm#ecdh>.

Childhood Environment Rating Scale (ECERS).<sup>15</sup> ECERS consists of 43 measures along seven dimensions of classroom services: personal care, furnishings and display, language and reasoning, activities, interaction, program structure, parents and staff needs.<sup>16</sup> A trained evaluator observes the classroom for at least two hours and rates on a scale of 1-7 (inadequate to excellent) each of the 43 measures, including items such as “meals and snacks,” “room arrangement for play,” “books and pictures,” “music and movement,” “math/numbers activities,” “general supervision,” “staff interaction and cooperation,” et cetera. The ECERS score is generally an unweighted average of the 43 measure scores. Helburn & Bergmann provide a more detailed description of ECERS and offer examples of how the methodology is applied in practice.<sup>17</sup>

To obtain a high ECERS score, preschools must have in place high staff-to-pupil ratios, appropriate teacher training in the classroom behaviors ECERS observes, physical environments that are conducive to learning, and appropriate materials. These requirements all increase the costs of preschool provision.

In summary, if a full-range of services including health, nutrition, and educational inputs are provided and for a long daily session such as 8-12 hours over a full year with highly-qualified personnel and low child-to-adult ratios, the cost per child can be as high as a good quality secondary education. Clearly, this is not typical. In contrast, if the sessions are short and the services offered are largely those of child maintenance using minimally-qualified personnel, the costs per child will be considerably lower than those for primary school children. In short, there is no valid figure for the cost of preschool

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<sup>15</sup> Helburn, S. and Bergmann, B. 2002. *America's childcare problem: the way out*. New York: Palgrave.

<sup>16</sup> Harms, T., Clifford, R., & Cryer, D. 1998. *Early Childhood Environment Rating Scale, Revised Edition*. New York: Teachers College Press, Columbia University.

<sup>17</sup> Ibid.

without a specification of the types of services, duration of sessions, and quality of personnel.

### **WHY EXISTING DATA ARE INADEQUATE FOR COMPARING COSTS**

Even if we knew the true cost of pre-K in different settings, we would not know if costs across states were higher or lower for similar types of services because of the large qualitative differences in participation and quality. But, even with this serious challenge to the interpretation of accurate data, the data that presently exist are highly inaccurate. Existing data provided by child care centers (in the case of NACCRRA) and states (in the case of NIEER) tend to be rough and incomplete estimates of total public and private costs of preschool.

Why are the data inaccurate? The main reasons are the fact that the costs of Pre-K are borne by many sources and not just the government. In addition, standard government and child care center accounting systems are designed to account for *expenditures* rather than *costs*.

#### **Multiple sources of funds**

Pre-K costs are derived from many sources. In many states the Pre-K function is supported by more than one level of government, such as state and local governments as well as the national government. It is often difficult for to coordinate and obtain accurate information from decentralized units of government because of poor accounting systems and a lack of capacity for reporting. As a result the figures are often guesstimates of something that may bear little resemblance to the true enrollments and costs.

Second, the private sector bears many of the costs of Pre-K through families, religious and voluntary agencies, employers, nongovernmental agencies, and in-kind

contributions from communities. Depending upon the arrangements, parents may be expected to pay fees and provide supplies, transportation, and food for their children. Religious and voluntary agencies often subsidize the costs of Pre-K where students are enrolled in private centers that are operated by these entities. In some cases these entities receive some public assistance, but much of the cost is born privately. Although the provision of services by individual volunteers and voluntary agencies has costs to those entities, these costs are not found in government accounting reports.

### **Inappropriate accounting systems**

Government accounting systems are generally designed to provide some transparency in how public funds are spent according to bureaucratic criteria such as agencies, functions, and objects (salaries, materials, and so on), but not the costs of specific services. The goal of such accounting systems is that of ensuring honesty in the disbursement of public funds through specifying a general system of accounts that would identify the ways in which the money was spent, not the cost of specific services for particular populations.

Government budgets typically separate operating costs from those of capital costs, and it is usually the former that are reported under annual expenditures. Even if one could include the costs of facilities and equipment, the government accounting systems are not based upon providing annual costs of these inputs into Pre-K. Usually, capital costs are funded out of separate budgets from operating expenses and sometimes from a government agency different from the one providing the service for children. Although there are standard principles for computing the annual service cost of such facilities, these are not typically used by governments. Rather, they report the expenditures for all of the

capital construction financed in a given year in their capital spending or the annual debt service on accumulated indebtedness. The latter is primarily a function of the timing of such construction rather than the annual pattern of facilities use. Public buildings that already exist and are used for Pre-K are not usually included under current costs or expenditures because they were fully paid for previously. They may be included in an amalgamated category of debt payments for all construction on which borrowing has taken place. But, the specific value of the facilities that are used each year for Pre-K will not appear in the overall cost information. From a cost accounting perspective this is an inappropriate practice since the cost of facilities should be distributed over their lifetime of use and charged appropriately in cost calculations for each year of use.<sup>18</sup>

A final problem in creating comparative cost figures is that price levels differ substantially across states and between urban and rural areas for the same resources. That is, the same model of Pre-K can carry different costs because the cost of qualified staff or facilities can vary by location. For example, university-certified personnel face different labor market conditions from place-to-place which affects their salaries and benefits. Costs of land and construction create large differences in the cost of facilities as well. A large portion of differences in costs may be attributable to these price differentials of resources rather than to the quality of Pre-K program offerings.

Although much more can be done by states and local governments to accurately report the costs of Pre-K, the difficulties in gathering data from private sources and different government levels and entities pose obstacles to obtaining comprehensive and accurate information. Even enrollment figures in Pre-K may be far from precise because

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<sup>18</sup> Levin, H., and McEwan, P. 2001. *Cost-effectiveness analysis: methods and applications* (pp. 64-70). Thousand Oaks, CA: Sage Publications.



of these barriers. Government accounting conventions that were not designed to measure costs of specific services further compound this difficulty. The result is that estimates of costs of Pre-K reported by individual states and local governments and child care centers themselves do not make for reliable comparisons and may be distorted.

## **MEASURING COSTS OF PRE-K**

There is a standard methodology for measuring the costs of Pre-K, and this can be adapted to the quest for development of comparable data reports among states. It is explained in detail in Levin & McEwan<sup>19</sup> and applied in various studies and the benefit-cost analysis of a major pre-school experiment: Perry Preschool.<sup>20</sup>

The basic model used to evaluate the resources needed and their cost is known as the “ingredients method.”<sup>21</sup> This method requires that cost estimations follow a number of relatively simple steps. The first is to identify and describe the specific programs that are offered for Pre-K. There may be more than one because of offerings of different government agencies or levels of government, and there may be variants such as a rural model and an urban model. The second step is to specify the “ingredients” or resources that are required to produce Pre-K services.<sup>22</sup> To the degree that each state has a model of Pre-K, it is possible to identify the ingredients required for that model in terms of personnel, facilities, supplies, equipment, transportation, and other inputs. These ingredients can then be specified for each type of center.

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<sup>19</sup> Ibid.

<sup>20</sup> One example can be found at Masse, L., & Barnett, W.S. 2002. A benefit-cost analysis of the Abecedarian early childhood intervention. In: H. Levin & P. McEwan, *Cost-effectiveness and educational policy* (pp. 157-176). Larchmont, NY: Eye on Education. For the Perry Preschool benefit-cost analysis, see Belfield, C., Nores M., Barnett W.S., and Schweinhart L. 2006. The High/Scope Perry Preschool Program, *The Journal of Human Resources* 41(1): 162-190.

<sup>21</sup> This method is described in Levin, H., and McEwan, P. 2001. *Cost-effectiveness analysis: methods and applications*. Thousand Oaks, CA: Sage Publications.

<sup>22</sup> See Chapter 3 of Levin & McEwan, 2001.

This type of analysis is facilitated by the use of financial spreadsheets such as in the software Excel where the first column lists the required ingredients for a center as well as the qualitative dimensions such as personnel qualifications, time allocations, and specific characteristics required of facilities and equipment. Ultimately, all of the ingredients should include sufficient detail about qualities and characteristics required. Obtaining this detail usually requires interviews with the authorities who implement the program; articles and reports on experiences of Pre-K centers are also instructive.

The reason for going beyond the “official” descriptions (e.g., state regulations) of the Pre-K programs is that often they are based upon aspirations rather than reality. Cost analysis must be premised on the *actual* resources or ingredients used in the endeavor, not just aspirations of what the program should entail. Further, the resources or ingredients that must be specified include not only those that are purchased by government, private agencies, and families, but also those that are provided in-kind such as donated space and volunteer labor. Each of these has an economic cost to those who provide the ingredient. From the overall analysis, it is possible to determine the relative contributions of government and other entities.

The analysis becomes more complex when there are many different models used by different levels of government or differentiated by rural and urban areas or when private entities are employing their own approaches to Pre-K. In that case, the prototype used by a state government agency will not suffice for cost analysis because there are other models as well. As we will suggest below, one strategy is to select representative samples of each type of Pre-K center or other entity for analysis and aggregate them with proper weighting to obtain an overall picture.

The third stage in an appropriate cost methodology is to identify the costs associated with each of the ingredients. Methods of setting out the cost for each have been well-developed in the literature<sup>23</sup> and usually employ costs for obtaining the resource in the marketplace. Thus, the salary and fringe benefits for obtaining teachers of a given quality are used to estimate their costs. Not all costs are ascertainable in the market, so other methods have been established for estimating the annual cost value of, say, existing facilities or of volunteers.<sup>24</sup> A complete listing of the ingredients and their costs is a requirement to complete the fourth stage of determining the overall cost of the intervention or the cost per student when divided by enrollments.

Beyond the costs at the level of Pre-K centers, it is important to estimate the cost of coordinating and administering the overall system. If this takes place in a central agency such as a state department of child welfare or education, it is possible to identify the ingredients and costs associated with the effort by specifying the personnel, facilities use, and other inputs at that level. Of course, these administrative and monitoring costs must be included in estimating the aggregate cost of the Pre-K system.

The fifth step is to ascertain where the resources come from or who provides them. That is, what is the division of cost burdens among national, regional, and local government as well as families and private entities supporting Pre-K? Not all of the costs will be covered by government expenditures, so costs must be distinguished from expenditures rather than assumed to be reflected in them. This type of cost distribution analysis is valuable because it also enables an evaluation of the proportion of costs borne

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<sup>23</sup> See Chapter 4 of Levin & McEwan, 2001.

<sup>24</sup> Ibid.

by families and the private sector, rather than simply assuming that all of them are borne by the public sector.

Unfortunately, the type of methodological analysis summarized briefly here has not been done for most states, although it has been attempted for North Carolina.<sup>25</sup> The reasons are that such analyses cannot be easily implemented with existing data and the many different versions of Pre-K that are found in the same state. Such analysis using the ingredients method requires substantial access to information and analysis, often a luxury in states with poor provision for such tasks.

## **INCORPORATING COSTS INTO INFORMED DECISIONS**

In this final section we suggest a method for incorporating costs into Pre-K planning that takes account of the specific services offered and their costs and allows adjustments and tradeoffs. This approach begins by developing a comprehensive list of Pre-K services and facilities of various qualities and determines their costs using the ingredients method. These ingredients are recorded on an electronic spreadsheet. Decision-makers, then, construct or simulate a program and estimated enrollments that are translated instantly into total cost and per-child cost. If the estimated cost is less than anticipated, the decision-maker adds additional services or improvements in the quality of services for a recalculated cost. If the estimated cost is greater than anticipated cost, the decision-maker can adjust services or their quality to meet the lower availability of resources. The decision-maker can also experiment with different combinations of services and simulate different tradeoffs of services to see their cost implications. All of

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<sup>25</sup> Yonce, K., Clifford, R., Doig, S., and Nugent, L., 2006. *NC's More at Four Pre-Kindergarten Program: A Cost Study*. FPG Child Development Institute: University of North Carolina-Chapel Hill.

this can be done in “real-time” and in the presence of teams of policy-analysts and decision-makers including legislative staff or political representatives. Thus it engages the decision and political process directly to constructing Pre-K programs that are subject to a given budget constraint.

This particular approach was pioneered by Chambers and Hartman<sup>26</sup> and Chambers and Parish<sup>27</sup> in addressing the construction and cost of special education programs. Using their Resource Cost Model, they first divided special needs students into handicapped categories and they asked decision-makers to construct desirable programs for each type of disability. When these programs were costed out for each condition and multiplied by anticipated enrollments for that condition and summed over all special education students, decision-makers were able to determine the total cost and per-pupil cost for special education. If the overall costs were beyond what was budgeted, they could simulate a new combination of program features to ascertain their cost consequences. This approach has also been used by Chambers<sup>28</sup> to evaluate the cost of career programs in high schools.

The Resource Cost Model is an obvious candidate for assisting decision-makers to construct Pre-K programs and ascertain their costs. Adjustments in program offerings can also be evaluated for their cost consequences as resource availability changes. And regional cost differences for similar services can be incorporated into the database. Given the fact that preschool and early childcare has many formulations in terms of services and

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<sup>26</sup> Chambers, J., and Hartman, W., 1983. *Special Education Policies: Their History, Implementation, and Finance* (pp. 193-240). Philadelphia: Temple University Press.

<sup>27</sup> See three chapters by Chambers, J., and Parrish T. (1994) in S. Barnett and H. Walberg (Eds.), *Cost Analysis for Educational Decision Making*. Greenwich, CT: JAI Press.

<sup>28</sup> Chambers, J. 1994. Career oriented high schools. In S. Barnett and H. Walberg (Eds.), *Cost Analysis for Educational Decision Making*. Greenwich, CT: JAI Press.

quality of inputs, these can be incorporated into applying the model used in special education to the Pre-K sector. At a time when states are expanding or upgrading their preschool offerings, the Resource Cost Approach can be a valuable planning tool. However, in the long run it is hoped that different service combinations can be evaluated for their impacts on different child development and educational outcomes so that a cost-effectiveness analysis might inform decision-making.