

Inequality in Early Childhood Education and Care: What Do We Know?

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The distribution of household income grew more unequal in the U.S. during the closing decades of the 20th century. Persistent and growing income inequality is arguably a problem in its own right. It is also a source of concern if income deficits and inequality exacerbate other social problems. These issues are particularly salient in the case of children, who have the least control over their economic circumstances but may have the most to gain (or lose) from economic resources. A large research literature links poverty with worse child outcomes, in terms of both short-term health and well-being and longer-term accumulation of human capital. There is some evidence that income inequality itself may also be a risk factor for children. Mayer (2000), for example, examines the association between trends in income inequality (at the state level) and the educational attainment of children. She finds that as income inequality increases, the educational attainment of low-income children declines while that of high-income children rises.

Although most inequality research has focused on disparities in income and wealth, other forms of inequality may also contribute to worse child outcomes. Early childhood education and care (ECEC) is one of the most crucial of these domains. As mothers with young children have entered the labor force in record numbers, families have shifted a greater portion of early child care from parents to nonparental babysitters, family day care providers, and centers. Most young children from all income levels now spend a portion of their time in nonparental care. But these care arrangements differ substantially across more- and less-affluent families.

Care arrangements differ by income (and other socio-economic characteristics) in the financial burden they impose on families of different means. Parents assume the majority of the costs of purchasing child care. Disparities in the resulting “cost burden” – i.e., out-of-pocket expenditures relative to income -- are both a product of and a potentially exacerbating factor in income inequality. Cost burden may also increase inequality indirectly by discouraging the employment of low-skilled parents.

Care arrangements also differ with socio-economic characteristics in the type and quality of care children receive. To the extent that children in less advantaged families receive less formal or lower quality care, these differences represent a direct form of social inequality. To the extent that the quality

of these arrangements influences development and health, inequalities in children's early care may also have lasting consequences. If children from less advantaged families receive worse quality care than their more affluent counterparts, and child care quality is associated with the early development of human capital, child care inequalities may exacerbate a multi-generational cycle of disadvantage.

Government policies have the potential to ameliorate disparities in child care cost burden and quality by subsidizing child care costs for low-income families and offering compensatory early education programs. The opposite could occur, however, if policies increase use of nonparental care (e.g. through work-related welfare policies) without equalizing cost burdens and quality between more- and less-affluent families. The development of early childhood education and care policies has been uneven both across time and across regions of the country and our knowledge about their impact on inequality is limited.

This review examines several dimensions of ECEC in relation to the recent growth in income inequality. Part I briefly reviews trends in income inequality and the wage, labor supply, and family composition factors that have interacted to increase inequality in recent decades. Part II reviews the current state of knowledge about three potential links between early childhood education and care (ECEC) and inequality: (1) disparities in families' child care cost burdens and employment disincentives, (2) inequalities in children's enrollment in formal and educationally-oriented modes of care and in the quality of care, and (3) short- and long-term consequences of ECEC experiences and quality for children's cognitive development, socio-emotional adjustment, and health. We use a combination of literature review and original data analyses to summarize the state of knowledge on these relationships and identify key areas for future research. Part III provides an overview of major public policies for financing child care and improving child care quality and comments briefly on what is known about the contribution of government. Part IV concludes by summarizing what is known, and what remains to be learned, about the associations between inequalities in ECEC and income.

Although many of the individual issues addressed below have been the subject of considerable research, they have almost never been examined in the context of the relationship between ECEC and

inequality. For instance, there is a large literature examining how child care costs influence the employment decisions of mothers with young children. However, to our knowledge, no one has previously examined how these labor supply decisions affect either the inequality of family incomes or disparities in school readiness among children. Similarly, patterns of ECEC use have been studied but past research has rarely focused on how differentials in use relate to family incomes (or other dimensions of inequality) or how they contribute to or ameliorate inequality in family or child outcomes. Many aspects of this review are therefore inconclusive or speculative in nature and point to directions for future inquiry.

Part I: Income Inequality

Income inequality grew substantially toward the end of the 20th century. Jones and Weinberg (1998) report that between 1975 and 1993, households in the 90th percentile saw their incomes rise by 24.5 percent, while those in 10th percentile experienced decreases of 2.3 percent. To understand how these dramatic changes in the income distribution came about, and the relevance of ECEC, we very briefly consider the trends in wages, household composition, and labor supply which, in combination, represent major sources of household incomes.

The growth of income inequality can be traced, in large part, to rising wage inequality – particularly during the 1979-1995 period (Katz and Autor, 1999; Ellwood and Jencks, 2001). The consequences of the changing wage structure were partially offset by increases in women’s labor force participation. The proportion of women in the labor force rose from 38 percent in 1960 and 52 percent in 1980 to 60 percent in 1999 (U.S. Bureau of the Census, 2001). Two-adult families, in particular, responded to declining wages by moving more adults into the workforce (Mishel, Bernstein, and Schmidt, 2001).

Growing income inequality from the 1970s through 1990s can also be partly traced to changes in family composition. Single motherhood has increased, particularly among less-skilled women (Ellwood and Jencks, 2001). In sharp contrast, there was little change in single motherhood among mothers in the top third of the educational distribution.

Like their married counterparts, single mothers increased their labor supply quite dramatically during the latter half of the century. By the early 1990s, the annual hours of work among single and married mothers with children under six were nearly identical (Cohen and Bianchi 1999); by 2000, more single mothers with children under six were in the labor force (70 percent) than married mothers with children of the same age (63 percent) (Statistical Abstract of the United States 2001, p. 373).

Part II: Income Inequality and ECEC

The proportion of pre-school age children spending some time in non-maternal care has risen steadily in recent years, closely paralleling the rise in women's labor force participation. Child care is now a fact of life for most children. In 1999, for example, 66 percent of preschool age children under the age of 5 were in some type of regular child care arrangement.¹ A large share of non-maternal care (43 percent) is provided by relatives, but nearly as many children (37 percent) are cared for by non-relatives in market settings such as day care centers or family day care homes (and 14 percent of pre-schoolers are cared for by both relatives and non-relatives).

The distribution of ECEC in the largely market-based U.S. system has historically reflected socio-economic differences in both parents' demand and parents' ability to pay for various forms of care. The rise in ECEC use and in income inequality at the end of the 20th century gives these issues new urgency because the factors contributing to income inequality are intimately connected to patterns of child care use. Most obviously, the rise in women's employment was associated with a substantial increase in the use of nonparental child care. The sharp rise in employment among single mothers is particularly notable in this regard. Importantly, this increase in the use of nonparental child care was occurring in tandem with rising wage inequality and falling wages for the least-skilled workers. An unprecedented number of families were placing their young children in nonparental care by the end of the 20th century and many were doing so with very limited financial resources.

The implications of these changes for inequalities in income and in child care, and the relationships between these inequalities, are poorly understood. At least three linkages are plausible.

First, ECEC costs may impose unequal cost burdens on families that increase income inequality both directly and indirectly. Until children reach the age of entry into kindergarten, most ECEC arrangements are private – privately financed by parents and privately provided by individuals, centers, or preschools. Purchasing these care arrangements imposes a substantial cost burden on many families who use care; if the expenses are relatively similar within modes of care, the expenses will impose an exceptionally high burden on families with low incomes. This unequal cost burden may increase inequality directly. Child care expenses may also contribute indirectly to inequality by depressing maternal labor supply and earnings, particularly among lower-skilled workers for whom child care expenses represent a particularly steep marginal tax.

Second, SES-related disparities in ECEC use may create social inequalities in the type and the quality of care received by children in more- and less-advantaged families. Although use of ECEC has expanded for all income groups in recent years, patterns of care differ substantially by income, race/ethnicity, location, and other family characteristics. Highly disadvantaged children are less likely than their more advantaged peers to receive care in formal arrangements, more often receive informal care by relatives and friends, and are less likely to be enrolled in educationally-oriented preschool programs during the preschool years. These differentials may reinforce existing economic and social inequalities by segregating lower-income children in less formal types of care. This stratification will have more serious implications if quality of care is lower in less formal arrangements than more formal and highly regulated settings, or if, within modes of care, lower-income families use less expensive and worse quality arrangements.

Third, ECEC differentials may contribute to increasing inequality in the longer term through their effects on children's early development, learning, and health. Evidence is growing that children's early experiences matter – that a good start in life can promote learning and help children enter primary school with the skills, knowledge, behaviors, and attitudes that are necessary if they are to learn and meet normative expectations. School is the arena where children from different backgrounds meet and in principle benefit from equal opportunities, yet many low-income children enter school already at a

disadvantage relative to their more affluent peers and disparities in educational performance between low- and high-performing children appear to be growing over time. Children's early child care and educational experiences are not the only, or even necessarily the most influential, causes of these gaps. But if the mode and quality of care do make a significant contribution, and children's access to high quality arrangements is constrained by parents' income, disparities in ECEC may be widening the gap between the most and least advantaged children in both short-term school readiness and longer-term human capital development and life chances.

In the following sections we take up each of these three issues in greater depth, reviewing what is known and remains to be learned about the links between ECEC and inequality.

1. ECEC Costs and Income Inequality

The direct and indirect impact of child care costs on family income is both the most obvious dimension of ECEC inequality and one of the mechanisms that may be underlying other disparities. If child care costs are similar for families with different incomes, the relative "burden" or share of family resources devoted to child care will be greater for lower-income families. As income inequality has increased, and wages and incomes have declined for lower-skilled workers, both the absolute size and the relative inequality of this burden may have increased. Indirectly, child care costs may further exacerbate income inequalities by depressing the labor supply of less skilled parents, for whom child care costs represent a relatively larger marginal tax.

Assessing the inequality in the cost burden of ECEC is difficult because expenses as a share of income result from multiple inter-related factors including: (1) family structure (single versus dual parent households); (2) employment probabilities and earnings potential; (3) the probability of using non-parental care and the mode of care used; and (4) the cost of different modes of care. Information on each of these components is needed to provide reliable estimates of the cost burden of ECEC, but such data are difficult to obtain and are often not comparable over time. Moreover, determining whether public policy exacerbates or mitigates differences in the cost burden of ECEC requires understanding not only cost differences across groups but also how the need for nonparental care varies. Thus, it is important to

examine how factors, such as family structure and maternal employment, that influence the need for child care, have varied across groups and over time.

Large literatures have developed around each of these factors.² However, none directly examines the combined impact on the need for child care and the resources available for obtaining it. For instance, a fall in birth rates among single mothers or a rise in marriage probabilities tends to reduce the fraction of young children residing in single parent households, possibly decreasing the extent to which ECEC costs raise inequality. Conversely, higher maternal employment (particularly if induced by restrictions in welfare) is likely to elevate ECEC costs for low income women and raise disparities. Similarly, greater wage inequality may increase the share of income devoted to child care expenses by families at the bottom of the distribution and so further increase inequality of net incomes.

In light of these complexities, we employ several alternative methods in our review of the literature on inequality in cost burden. We begin with a review of cross-sectional estimates of ECEC arrangements and expenses by income group and maternal employment. We next suggest an analytic approach for examining changes over time in the cost burden of ECEC by educational group. We conclude by reviewing evidence for an indirect effect of ECEC costs on inequality through maternal labor supply.

a. ECEC Expenses We begin with an analysis of the 1990 National Child Care Survey, as summarized by Hofferth et al. (1991). These data provide the most complete source of published data on how child care arrangements and costs vary by income group at a point in time. Table 1 summarizes some of the key findings in Hofferth et al. by presenting costs of primary care for the youngest child (and these costs as a share of income) by income quintile for families with children under the age of five.³ The first panel of the table shows that annual costs rose substantially with income.⁴ Yet, even though high income families paid more for primary child care, these costs represented a greater share of the incomes of poorer families – accounting for 5 percent of income for the lowest quintile versus just 2 percent for the highest. Costs as a share of income were higher for families with employed mothers than for those without and again are disproportionately high at the bottom of the income distribution. For instance, primary child care costs in

the lowest quintile, for families with an employed mother who paid for care, were five times as high as for those in the highest quintile (25 percent versus 5 percent).⁵

One reason poorer families spent less (in absolute dollars) on primary child care is because they relied much more heavily on free sources of care. What is particularly striking is that, in 1990, while only one in five poor families paid for primary care for their youngest child, more than half of high income families did so. This occurs partly because mothers in low income families were less likely to work, a gap that narrowed some in the late 1990s. However, that is only a part of the story, since low income families were also much more likely to receive free non-parental primary care, particularly from relatives (see Table 2).

Conversely, high income families were much more likely to use expensive (and more formal) primary care. Greater use of expensive care among high income families was largely due their higher probability of utilizing center-based or family day care. A notable exception to this pattern is relatively high use of these arrangements among families with nonemployed mothers in the lowest income quintile. These families were more likely to have used center-based or family day care than similar families with incomes in the middle quintiles (although not in the highest). As discussed below, this probably results from the availability of means-tested compensatory and early education programs (such as Head Start) for the lowest income families.

The aforementioned data from the 1990 National Child Care Survey indicate that families with children under five who were paying for care averaged \$71 per week for primary care for the youngest child. Anderson and Levine (2000) and Smith (2002) using different data sources and time periods provide similar estimates of the average cost of primary care. Thus, estimates across sources and years appear to be reasonably consistent and indicate an average hourly rate of about \$2.50 per hour assuming that about 30 hours of primary care are paid for per week.

Anderson and Levine (2000) show that differences in costs largely depend on the mode of care, with relatively little variation across education groups conditional on mode. Center-based care is the most expensive, followed by family day care, and relative care is by far the least expensive. Overall, this

analysis suggests that poor families spend less on child care than their wealthier counterparts in absolute dollars but much more as a share of incomes. This suggests that the ECEC system in the U.S. imposes particularly steep financial costs on low income families.

b. Trends in ECEC Cost Burden

To illustrate how combinations of factors that influence the need for child care might be examined, Table 3 uses data from the 1986-2001 March Current Population Survey to document how hours worked, earnings, and family structure have changed over time for various groups of mothers with children under six. The fraction of mothers married decreased between 1985-1988 and 1997-2000 for high school graduates and those with some college (but no degree), with little change among those with more or less education. Maternal hours of work rose for all groups. Family earnings fell 4 to 10 percent for the three lowest educational groups, while college graduates experienced a 13 percent increase.

Table 4 reports a summary measure of the total effect of these various factors, calling it the “child care burden.” The child care burden is calculated by multiplying the mother’s work hours by her number of children under six and by \$2.50 per hour (which approximates the average cost of paid care) and then dividing this amount by total family earnings. Unlike other estimates that include the effects of endogenously determined differences in child care costs, our measure calculates costs as a ratio of incomes assuming all families pay the same price for their child care.¹⁰ Although this represents a useful starting point for assessing the relationship between child care costs and inequality, it is incomplete to the extent it ignores the effects of changes over time in tax or transfer policies (such as increases in child care subsidies for low income families, child care tax credits for middle and high income households or expansions of the Earned Income Tax Credit) and in government child care and early education programs (like Head Start).

Table 4 indicates that the child care burden increased between 1985 and 2000 for all groups, except the most educated. The child care burden rose relatively little for married couples, because higher earnings tended to offset increases in maternal hours of work. The situation is different for unmarried mothers. Because the child care burden simply is the ratio of the child care costs per hour for all of a

woman's children divided by her wage rate, the lower wage rates of less educated mothers result in their child care burden being very high.

This analysis suggests that inequality in the child care burden may be increasing with time. Once again this is simply a measure of the potential cost of ECEC across educational groups, since it does not reflect the lower cost (and possibly lower quality) of child care arrangements typically used by lower income mothers. Perhaps more importantly, it does not reflect other sources of income, such as transfer and child support payments or investment income that may vary dramatically across groups.

c. ECEC Costs and Maternal Employment

Variation in the relative burden of expenses across families is not the only way that child care costs contribute to inequality. It also seems likely that these expenses will directly reduce the incentives to obtain work. Since such effects are likely to be particularly salient for mothers who would receive low wages, income inequality may be further exacerbated. Anderson and Levine's (2000) review of the extensive literature linking labor supply and child care costs concludes that there is a consistent negative relationship between child care expenses and maternal employment, with estimated employment elasticities (a measure of the sensitivity of one variable to another) with respect to child care costs clustering around -0.3 to -0.4. Elasticities in this range indicate fairly strong disincentive effects.

One limitation is that most prior research relies upon individual variation in child care costs (Averitt, Peters, and Waldman, 1997; Connelly, 1992; U. S. Government Accounting Office, 1994; Kimmel, 1995 and 1998; Michalopoulos, Robins, and Garfinkel, 1992; and Ribar, 1992 and 1995) or geographic variation in these expenses (Blau and Robins, 1988; and Han and Waldfogel, 2002).¹¹ Using such methods, it is likely to be difficult to disentangle the effects of cost from those of unobserved characteristics that determine employment or the use of paid child care. Therefore, it is reassuring that similar elasticities are obtained by Berger and Black (1992), Gelbach (2002), and Meyers, Heinze, and Wolf (2002) using data from natural experiments on a few selected samples. A third approach, employed by Meyer and Rosenbaum (2001) and Bainbridge, Meyers, and Waldfogel (2002), exploits variation over time within and across states to estimate the effect of child care subsidies on employment. Once again,

both papers find that single mothers in states with higher subsidies have higher employment rates with estimated elasticities in most specifications between -0.1 and -0.3.

Some caution is required in concluding that child care costs contribute to income inequality by affecting employment or work hours, since linking ECEC expenses and labor supply does not directly reveal whether child care costs exacerbate income inequality by reducing employment more among low income mothers than high income mothers. Since these costs are generally a larger share of income for disadvantaged families and the literature has generally found that the employment of less skilled and low income mothers is more sensitive to child care costs, this seems likely.¹² However, a full answer to answering this question depends on knowing the employment elasticity with respect to the child care burden (rather than dollar costs).

d. Summary

Although a number of studies have examined ECEC costs, few have taken up the questions of how child care cost burdens reflect and contribute to income inequality. Our review of the literature suggests that, although poor families spend less in absolute dollars on child care than more affluent families, this is largely due to differences in their use and mode of care. Differences in costs to families are dwarfed by the disparities in incomes with the result that ECEC expenses impose particularly steep financial costs on low income families. We estimate that the child care burden increased during the 1985 to 2000 period for all groups except the most highly educated, increasing inequality in cost-burden over time. The literature also suggests that child care costs make an indirect contribution to inequality, by depressing maternal employment, particularly among less-skilled and single mothers.

Despite large literatures on family structure, family labor supply, income inequality, child care policy, and child care arrangements and costs, very little is known about the interrelationships between these forces. Important questions for future research include the following:

- Have child care burdens become more equal or more unequal as employment increased for married mothers and later for single mothers?

- Have child care policies, such as Head Start, child care subsidies, and child care tax credits, kept up with increases in maternal employment? And have the changes in policies ameliorated or exacerbated income inequality?
- Do families with higher child care burdens choose lower cost (and presumably lower quality) child care options? Is maternal employment lower among these families with higher child care burdens, perhaps indirectly contributing to income inequality?

2. *Inequality in the Use, Type, and Quality of ECEC*

The preceding section demonstrates that lower-income families are more likely than more affluent families to rely on less formal forms of nonparental care. These differences may reduce inequalities in cost burden by reducing child care expenses among the lowest income families. But these same differences may represent other forms of inequality. Income-related differences in the use and mode of ECEC constitutes a direct form of social inequality if the use of ECEC is a normal good (i.e., on that people would want to buy more of if they could) and the receipt of any care, and type of care used, is constrained by family income. These differences reflect more serious inequalities if they are associated with differences in quality. Income may be associated with quality in at least two ways. Low income children may receive worse quality care if formal care is, on average, of higher quality or more developmentally enhancing than informal care. Quality may also vary within modes of care. If this variation is related to price, low income children may receive worse quality care within modes than those in families with more resources for purchasing care.

In this section we review what is known about income-related differences in the type and quality of care that children receive. We begin by examining patterns of child care use in greater detail, using recent data on care arrangements for young children and over-time data on preprimary enrollment specifically among children aged 3-5. We then turn to two questions about ECEC and income inequality: First, do differentials in ECEC arrangements reflect income constraints? And second, do they correspond to differences in the quality of care received by children?

a. *Variation in ECEC Arrangements.*

The previous section documented large differences in the types of care received by more- and less- advantaged children as of 1990. An analysis of more recent data suggests that these disparities persisted through the end of the decade. Table 5 describes the ECEC arrangements of children in 1999 using data from the SIPP.¹⁴ Looking first at Panel A, which describes the care arrangements of all children under the age of 6, we can see that “no nonparental” (i.e., only maternal or parental) care was more common for poor and near-poor children (44-45 percent) than for those who were more affluent (34 percent). The primary care arrangement was also more likely to be informal relative care for poorer children (23-25 percent) than for those in more affluent families (19 percent of children). The relationship between income and use of center-based care is “U” shaped: children under six in near-poor families were least likely to be in center-based care for their primary arrangement (20 percent), in contrast to 28 percent of those in more affluent families and 23 percent of those in poor families.¹⁵ This suggests that the availability of means-tested public ECEC programs for the poorest children may partially offset income-related disparities in the use of center arrangements. Nevertheless, both poor and near-poor children lagged their more affluent counterparts in receipt of formal care.

Table 5 reveals other associations between ECEC use and families’ socio-economic characteristics. The likelihood that children experienced no nonparental care declines steadily with mothers’ income while the probability of having any center-based care rises. Differences by race/ethnicity are also striking, with notably lower use of center-based arrangements for Hispanic children. As noted above, differences in rates of maternal employment would be expected to explain some of the differences in ECEC use between less- and more-affluent families. Panel B of the table suggests, however, that some of these differences are more extreme if we consider only families in which the mother is employed.

These findings echo those of a number of other studies that have documented socio-economic differences in children’s exposure to nonparental, and particularly formal, care arrangements at various points in time (Hofferth et al., 1991, West, et. al., 1992, Anderson and Levine, 2000; NICHD ECCRN, 1997; Ehrle, Tout and Adams, 2001; NCES, 1999). Together, these studies suggest substantial income

and educational stratification in children's experience of early care. Because they rely on data sources that differ in their samples, measures, and coding, however, it is difficult to draw conclusions about whether socio-economic differences in ECEC have grown or diminished over time.

To compare ECEC disparities over time, we make use of data from the October Current Population Survey (CPS) from 1964 to 2000. This survey collects data annually on children's school enrollment. Although primarily designed to collect school enrollment data for older children, the survey also collects information on enrollment of children age 3 to 5 in pre-primary school programs.¹⁶ Despite minor changes in question wording over the period, the October CPS provides a fairly consistent time series of data on the enrollment of 3-5 year olds in center- and school-based pre-school programs such as Head Start, nursery schools, pre-kindergarten and kindergarten.¹⁷ These measures are particularly relevant to issues of inequality, as educationally oriented preschool experiences have become an increasingly normative part of children's preparation for school entry

The use of preprimary arrangements has grown steadily in recent decades, with the percentage of 3 and 4 year old children enrolled in preprimary school programs increasing from less than 10 percent in 1964 to 52 percent in 1998 (Figure 1). When we disaggregate this trend by the age of the child and by family characteristics (Figures 2-3), we see evidence that while enrollment in preprimary school programs has increased over time for all groups, socio-economic differences have been remarkably persistent. For both 3- and 4-year old children, enrollments have remained somewhat higher for those whose mother is employed. Hispanic children have been less likely to attend school/centers than their non-Hispanic counterparts. Interestingly, there are no notable differences by mother's marital status. The most striking differences are associated with maternal education and family income. For both 3 and 4 year olds, the children of the highest-educated parents have had the highest rates of enrollment and the children of the least-educated parents have had the lowest. In both groups, children in the highest income families have remained the most likely to attend preprimary programs, with lower and relatively similar rates of attendance among children in the bottom two quartiles of the income distribution.

Trends in pre-primary school enrollments for 5-year olds, shown in Figure 4, provide an interesting contrast. By the late 1970s, enrollment of 5-year olds in some form of school (for the most part, public kindergarten) was nearly universal. Differentials associated with race/ethnicity, mother's education, and family income were evident at the start of this data series, in the 1960s, but these differences largely disappeared in the period between 1970 and 1980 as enrollments in public kindergarten rose.

b. ECEC Differences and Inequality

Observed socio-economic differences in ECEC use and mode raise the obvious question of whether, and to what extent, these differences result from inequalities in family resources. Does the cost burden associated with more formal modes of care effectively price lower income families out of more desirable modes of care?

Researchers have considered a number of alternatives to income for explaining socio-economic differences in ECEC. Disparities in child care use are sometimes credited to problems of supply. There is little evidence of widespread shortages of child care services, as private markets have been quite responsive to increases in parents' demand for child care. Blau (2001), for example, estimates that the for-profit child care sector expanded by 143 percent, and the nonprofit sector by 77 percent, between 1982 and 1997 as more women entered employment and sought substitute child care arrangements. Several researchers who have examined the distribution of child care services more closely have noted that the supply of formal, regulated care varies with local socio-economic characteristics, with particularly limited supply in rural and economically distressed areas (e.g. Fuller and Liang 1996; Gordon and Chase-Lansdale 2001). Given the market's general responsiveness to demand, however, it is difficult to distinguish geographic variation in supply from the distribution of consumer demand.

Socio-economic differences in the use of formal care arrangements may also reflect differences in labor force participation between, for example, more- and less-well educated mothers. However, as noted above, the use of nonparental care is very high among all families with employed mothers and some socio-economic differences in the type of care used are even sharper among families in which mothers are

employed. When we focus specifically on the enrollment of 3-5 year olds in preprimary school programs (Figures 2 and 3), we find that differences in enrollments between the children of employed and nonemployed mothers, while persistent, are smaller in magnitude than those associated with either parents' education or family income.

It is also possible that differences in the enrollment of children in more formal care arrangements reflect variations in the preferences of families by race, ethnicity, education or other characteristics. When analysts control for (some of) these factors, income related-differences are reduced but not eliminated. Hofferth et al. (1993), for example, found that income-related differences in center-based care experience persisted after holding constant employment status and other family characteristics. Researchers with the NICHD Study of Early Child Care (the Early Child Care Research Network or ECCRN) (1997) also report that income has the most consistent association with the amount and type of care received by infants, controlling for other factors.

We reach similar conclusions when estimating the effect of income on enrollment in preprimary school programs using the October CPS data and controlling for a rich set of covariates, including race and ethnicity and parental education (see Bainbridge, Meyers, Tanaka, and Waldfogel, 2002 for details). The effects of income on the enrollment of 3, 4, and 5 year olds, over the 1968-2000 period, were only partly explained by these other factors. Among 3 year olds, children from families in the top income quartile were 23 percent more likely to be enrolled than children from the bottom income quartile before controlling for other family characteristics; they remained 15 percent more likely to be enrolled after controlling for the child's race/ethnicity and for the mother's employment status, marital status, and education. The results for 4 year olds were similar: the top quartile was 23 percent more likely to be enrolled without other controls, 16 percent more likely after including them. There is a smaller differential among 5 year olds, 7 percent before including controls, 6 percent after doing so, presumably due to the wide availability of public kindergarten at that age.

The association between family income and use of more formal modes of care after controlling for other family characteristics suggests that family resources do constrain ECEC choices. This is

consistent with results of several econometric analyses of the effect of price on child care mode. A number of studies conclude that that a reduction in the cost of care leads parents to substitute market forms for more informal arrangements (Michalopoulos and Robins 2002; Micholopoulos, Robins and Garfinkel 1992; Cleveland et al 1996; Powell 1997). Blau (2001), for example, concludes that both maternal wage and family income elasticities are positive for center care and negative for other forms of care, suggesting that as wages and family income rise, families tend to switch from less formal to more formal care arrangements. As he suggests, “parents feel most ‘priced out’ of center and family day care and would prefer these types over other nonparental care and parental care if they were equally as cheap” (p. 74).

d. ECEC Quality and Inequality

If lower-income families are priced out of not only formal care but out of high quality care, these disparities may result in even more serious forms of social inequality. To evaluate these issues, we would ideally like to know the degree of socio-economic inequality in the quality of ECEC and whether this dimension of inequality has risen or fallen over time. Unfortunately, the research here is not well developed.

Quality of child care is hard to define, and even harder to measure. Measures of quality generally consider issues of health and safety, adequacy of supervision, developmental appropriateness, and the warmth and responsiveness of the caregiver. These factors are important in the short term (e.g., for the safety of children and responsiveness to their emotional needs). As we discuss below, they have also been associated with children’s cognitive development and school preparation.

Most studies of child care quality rely on structural characteristics of the child care settings like group size, staff-to-child ratios, or the educational qualifications of the caregivers. These characteristics are relatively easy to measure and have been associated with both caregiver responsiveness and child outcomes (e.g. NICHD ECCRN 2002). But they are unlikely to fully capture the quality of the care actually delivered. The most in-depth studies of quality have gathered data on dimensions of process quality – such as cognitive stimulation and sensitivity to children’s needs – by having one or more

observers spend time at the child care setting recording the quality of care along various dimensions, using standardized scales developed for this purpose.¹⁹

A number of observational studies conclude that the quality of most child care in the U.S. is low. Using data from the Cost Quality and Outcomes Study (CQOS), Helburn et al., (1995) conclude that care at most centers was poor to mediocre, with only one of seven judged to be providing a level of quality sufficient to promote healthy development. The youngest children fared the worst – almost half the infant and toddler rooms were providing poor quality, and only one in twelve was supplying developmentally appropriate care. Galinsky, Howes, Kontos, and Shinn (1994) found similar results in a study of relative and family child care; only one in ten providers was rated as providing good care, about a third as supplying inadequate care, and slightly over half rated as providing care that was adequate or custodial. More recently, the NICHD ECCRN (1997) assessed the quality of child care experienced by a sample of children born in 1991. Using a specially developed measure (the Observational Record of the Caregiving Environment) that allowed formal and informal providers to be assessed on the same scale, the study found that 61 percent of the ECEC arrangements experienced by children under age three were of “poor” to “fair” quality.

In relation to inequality, we are primarily interested in the question of whether quality is lower, on average, for children from less advantaged families. Differences in mode of care may serve as a proxy for quality differences because market forms of care (i.e. centers and family child care) are more likely to be regulated for quality than informal care with relatives and friends. Quality standards are highest, and most consistently enforced, in public early education programs such as Head Start. Although public regulation of private arrangements is a less consistent predictor of quality, the dimensions regulated by most states – particularly staff training and education -- have been found to predict process quality and better child outcomes (e.g. Clarke-Stewart et al. 2002; Burchinal et al. 2002; Burchinal et al. 2000; Blau 1997, 2000; Ghazvini et al. 2002; NICHD ECCRN 1999; NICHD ECCRN 2002). The stringency of state regulations has also been linked to lower rates of accidental injury in child care settings (Currie and Hotz 2001).

Assuming that more formal, highly regulated forms of care provide higher quality of care is problematic for a number of reasons. As noted above, observational studies suggest that the majority of care in formal settings may not meet professional standards for developmentally-enhancing care. Children also benefit from different types of care at different ages, and the formal modes of care most likely to be regulated (i.e. centers) may confer fewer developmental benefits for younger children. And although market forms of care are more likely to be regulated, these regulations are highly variable and weak in many states. (We return to this issue in our discussion of public policy below). More direct evidence would be obtained by comparing quality dimensions across modes of care but, given measurement difficulties, researchers have rarely made such comparisons. The NICHD Study of Early Child Care, one of the few studies to do so, assessed “positive caregiving” in both formal and informal settings and found that it was in general more characteristic of informal settings (NICHD ECCRN, 2000). Notably, they concluded that this was particularly true for infants and toddlers, raising the possibility that younger children receive fewer benefits from group care.

Contrary evidence that formal settings provide higher quality is provided by studies that compare children’s outcomes by mode of care. As we review in more detail in the next section, high quality ECEC has been associated with improved developmental outcomes that have particular relevance for the school readiness of older preschool children. A handful of studies suggest that these improved outcomes are more strongly associated with more formal care arrangements. Children who attended center-based care tend to have better pre-academic skills and better language development than those who do not (Clarke-Stewart and Fein, 1983; Belsky, 1984; Hayes, Palmer, and Zaslow, 1990). The same NICHD ECCRN researchers who rated informal care more highly on positive caregiving, above, also concluded that center-based care was more strongly associated than informal care with children’s cognitive and language development (NICHD ECCRN, 2000), results that have been confirmed in more recent analyses (see NICHD ECCRN, 2000, in press b).²⁰ Similarly, a recent study using data from the Infant Health and Development Program, which provided high-quality center-based care, finds that the greatest and most lasting cognitive gains accrue for the children who would otherwise have experienced non-center based

care (Hill, Waldfogel, and Brooks-Gunn, 2002). This study is important because it suggests that children currently using non-center based care would benefit if they were moved into high-quality center based care.

Although far from conclusive, research suggests that the minimally regulated informal arrangements used disproportionately by low-income families may provide less developmentally enhancing care than more formal arrangements. Evidence is less ambiguous that they use poorer quality of care within modes. For children in family or relative care, income is positively associated with quality. In their study of such children, Galinsky, Howes, Kontos, and Shinn (1994) found that families with higher incomes were more than twice as likely (65 percent) to be using regulated family child care than those with incomes below (26 percent), while middle-income families were in between (39 percent). Regulation is not synonymous with high quality but the authors found that, even after controlling for maternal education, family child care providers serving higher income families were rated as more sensitive and less restrictive than those serving low-income families. Care arrangements used by more affluent families were also more likely to be rated as at least “adequate” than those used by lower-income families. The NICHD ECCRN (1997) also studied quality differentials among children using relative or family child care and found a positive correlation between quality and family income.

Studies of children in child care centers also reveal income-related disparities in quality, but here the “U” shaped distribution described earlier for both access and costs is again evident. The highest quality care is received by children in affluent families, who can afford to purchase good care, and those in the poorest families, who may be enrolled in public compensatory and early education programs (Phillips et al., 1994). Most recently, the NICHD ECCRN (1997) reported that among children in center-based settings, those from low- and high-income families received higher quality care than those from moderate-income families.

e. Summary

Children in low income families, and those with more poorly educated mothers, are less likely than their counterparts to be enrolled in formal care and pre-primary school programs. Over the last

twenty years, income and other socio-economic differences in pre-primary enrollments have largely disappeared for 5-year-olds, but they have persisted for younger children. The notable exception to this pattern is somewhat higher enrollments of very poor children (relative to those in near-poor families) in center-based arrangements, likely due to the availability of means-tested preschool programs.

A number of studies suggest that the cost of formal, market-forms of care depresses use by lower-income families. The disproportionate, and possibly increasing, cost burden of ECEC described above may therefore contribute directly to the persistence of inequalities in the type of care children receive. Whether these inequalities have additional implications for children's well-being depends on the quality of care that is provided in various modes of care. Direct evidence that more highly regulated, formal settings provide higher quality care is limited because researchers rarely compare quality across types of settings. Indirect evidence is provided by studies linking regulated features of care to quality and studies documenting better cognitive and school readiness outcomes for children who experience formal care. These advantages are likely to be particularly important for 3-5 year old children, insofar as child care centers, pre-schools, and pre-kindergartens expose them to educationally-oriented materials and help them acquire skills and behaviors that they will need in school. Researchers have done more to document income-related disparities of quality within types of care. Unless they are enrolled in high quality public preschool programs, children from lower income families appear to receive worse quality care within care modes.

Available research thus suggests that many low-income children may be triply disadvantaged by being disadvantaged at home, having lower enrollments in educationally oriented center-based or school-based programs, and exposure to lower-quality care even if they do attend such programs. Data also suggest that public programs may be offsetting some of this disadvantage for the poorest children, who are more likely to be enrolled in formal care and receive somewhat higher quality care than near-poor children. We know relatively little yet about how these income-related disparities have changed over time and in relation to changes in income inequality.

A number of important questions need to be answered to more fully understand the relationships among ECEC arrangements, quality, and income inequality:

- To what extent is income a barrier to use of formal care, controlling for other family-level characteristics that influence child care choice? How have disparities in the use of formal care changed over time, given changes in maternal employment, wages, family composition, and other factors affecting child care need and resources?
- Has the effect of income on families' ECEC arrangements changed over time? Have government policies strengthened or weakened this association?
- How does quality of care vary both across and within modes of care? Does this association itself vary with the age of the child and other family characteristics? Has it changed over time, given changes in families' consumption of ECEC and changes in government policy designed to reduce income constraints and improve child care quality?

4. The Links between ECEC and Inequality in Child and Adult Outcomes

If ECEC makes a significant contribution to children's early health and development, which in turn shape longer-term skill development and economic success, ECEC disparities could contribute to perpetuating (or breaking) a cycle of inequality. For this reason, we next review the evidence on how ECEC influences children's outcomes in three areas associated with long-term well-being: cognitive development, socioemotional development and health.

a. Cognitive Development.

Children's early life experiences – both in the home and in non-familial settings such as child care – influence the development of cognitive capacities that help children succeed in school and in later life (Shonkoff and Phillips, eds, 2000). Although development continues throughout childhood and into adulthood, the quality of children's very early experiences may be particularly crucial for shaping later life chances.

Children's cognitive abilities are already very unequal by the time they start school. Baseline data from the Early Childhood Longitudinal Survey, Kindergarten Class of 1998-99, for example, indicate that

low-income children score more poorly than higher income children on all four measured dimensions of school readiness – cognitive skills and knowledge, social skills, physical health and well-being, and approaches to learning (West, Denton, and Germino-Hausken, 2000) (see also data from the National Household Education Survey's School Readiness modules, in Nord et al., 2000). These early disparities are likely to persist into later childhood and adolescence. Thus, Phillips (1999) finds that at least half the test score gap between black and white children in the twelfth grade was already present in first grade (see also Entwisle and Alexander, 1993; Alexander and Entwisle, 1996; and Phillips, Brooks-Gunn, Duncan, Klebanov, and Crane, 1998).

Sorting out the causes of these disparities is complex. Some differences in school readiness between higher- and lower-income children can be traced to the home environment (see, for instance, Nord et al., 2000). But, although the influence of the home environment may be paramount, research suggests that non-familial experiences during early childhood are also important. A number of randomized and controlled experiments have documented lasting cognitive gains for children experiencing high-quality interventions in the years before school (see Karoly et al., 1998; Brooks-Gunn, 2000; Ramey and Ramey, 2000; Vandell and Wolfe 2000; and Waldfogel, 2002 for reviews). These gains are particularly large for the most disadvantaged children: poor children appear to benefit the most dramatically from high quality early childhood interventions and to be most adversely affected by poor quality care (Berlin et al., 1998; Ramey and Ramey, 1998; Currie, 2000). There is related evidence that the cognitive gains are also largest for children whose mothers have the lowest levels of education themselves (see evidence from IHDP summarized in Karoly et al, 1998; Waldfogel, 2002).

Non-experimental studies provide additional evidence about the influence of ECEC experiences. A number of researchers have used naturally occurring variation in families' use of ECEC to assess the impact of ECEC on children's outcomes. These studies have the advantage of including a range of care arrangements that vary in structural and process quality; they have the disadvantage of not being able to control for unobserved factors associated with the selection of different types of children into different types of care or care of different levels of quality. This caveat notwithstanding, the evidence suggests that

children attending higher-quality child care in their pre-school years have higher levels of cognitive skills (Clarke-Stewart, Gruber, and Fitzgerald, 1994; Kontos, Howes, Shinn, and Galinsky, 1995; Peisner-Feinberg and Burchinal, 1997; NICHD ECCRN, 1999, 2000 and in press b) and enter school better-prepared to learn (Peisner-Feinberg et al., 2001). The effects of quality also tend to be larger for low-income children than for more affluent children, and for children with less-educated mothers than for children with more-educated mothers (Vandell and Corasaniti, 1990; Baydar and Brooks-Gunn, 1991; Bryant, Burchinal, Lau, and Sparling, 1994; Caughy et al., 1994; Peisner-Feinberg and Burchinal, 1997; and Burchinal, Peisner-Feinberg, Bryant, and Clifford, 2000).

Although encouraging, these studies are limited in important respects. Most rely on indirect measures of quality (such as staffing ratios) which, as noted above, may not capture important dimensions of quality. Nonexperimental studies may also be contaminated by the omission of controls for unobserved differences between families choosing different child care settings. This latter issue is explored at length by the NICHD ECCRN and Duncan (2002). They conclude that higher quality is associated with small improvements in child cognitive development, with larger effects for children whose cognitive scores were low to start with.

b. Socioemotional Development.

A large literature has examined the links between early child care experiences and children's socio-emotional development.²¹ The focus of much study has been to learn whether early and extensive experience of non-maternal care places a child at risk of insecure attachment to the mother and hence at risk of later behavioral problems.

After extensive research, the issue of insecure attachment seems to have been put to rest. As an authoritative review in The Handbook of Child Psychology concluded, "it now seems clear that most infant-mother attachments are not adversely affected by regular nonmaternal care" (Lamb, 1998, p. 92). However, the question of possible links between early and extensive child care and later behavior problems remains. Early maternal employment or use of child care is frequently associated with more problem behaviors for children (Haskins, 1985; Belsky, 1986, 1990; Vandell and Corasaniti, 1990;

Baydar and Brooks-Gunn, 1991; Belsky and Eggebeen, 1991; and Bates et al., 1994).²² Unfortunately, most of the investigations have been limited by small sample sizes and a lack of information on the child's home and ECEC environments. In particular, the results may be biased by the lack of data on the quality of child care, which has been found to be an important contributor to children's behavioral and social competence outcomes (Lamb, 1998; Bornstein et al., 2001).

The continuing interest in the possible links between early child care use and poor behavioral outcomes provided one important rationale for the NICHD Study of Early Child Care, which since 1991 has been studying the cognitive and socio-emotional development of a cohort of children from 10 sites nationwide. The NICHD ECCRN collected extensive data on children's early home and child care environments and on their cognitive and socio-emotional outcomes. The latest available results indicate that early and extensive experience of non-maternal child care is associated with elevated risk of behavior problems among 4 ½ year old children (NICHD ECCRN, in press a). However, children attending centers meeting recommended standards for quality have fewer behavioral problems than those experiencing poorer quality care (NICHD ECCRN, 1999). Bornstein et al. (2001) report similar findings for a small sample of children followed to age 7. These findings are consistent with most earlier research on two main points: (1) early and extensive experience of child care is correlated with higher levels of later behavior problems; and (2) the number of behavior problems is negatively related to the quality of child care.

It is worth noting that participation in high quality early intervention programs does not appear to adversely affect socioemotional outcomes. Instead, research typically finds either no significant effects or positive impacts. For instance, the Perry Pre-School program achieved its strongest and most lasting (beneficial) effects on social outcomes such as delinquency and crime (Karoly et al., 1998). This may occur because the Perry Pre-School care did not begin early, was not for long hours, and was of very high quality.

Taken together, the evidence does not suggest one uniform set of effects of ECEC on socio-emotional outcomes. Rather, the consequences are likely to depend on the age at which the child enters

ECEC, the hours spent in the program, and the quality of the care provided. The effects are also likely to vary depending on the characteristics of the child (Shonkoff and Phillips, 2000) but, aside from gender differences, this latter issue has received surprisingly little attention to date.

c. Child Health.

An extensive medical literature has examined the potential effects of early non-parental day care on child health. Conversely, information is more limited on the role of early enrichment programs (such as Head Start) that provide compensatory education to low income or at-risk children in the years immediately preceding school entry. There is also a small literature on ECEC and injuries, prompted by concerns that children in non-parental care might be at elevated risk.

The medical literature indicates that infants and toddlers placed in day care are more likely to contract infectious diseases such as upper and lower respiratory tract infections, gastroenteritis, and infections caused by viruses such as hepatitis A, cytomegalovirus (CMV), and H. influenza type B. Respiratory tract infections (e.g. asthma/wheezing, allergies, ear infections, colds, bronchitis, and pneumonia) have been most thoroughly researched. The evidence uniformly indicates that child care in the first year or two of life increases the frequency of these ailments, and that higher risks are generally associated with center-based than family day care (Celedón et al., 1999; Rovers et al., 1999; Koopman et al., 2001). Non-parental care also raises the risk of acute diarrhea, particularly when center-based (Reves, et al., 1993; Matson, 1994; Louhiala, et al., 1997). Other infectious diseases have been less researched but existing studies usually indicate similar patterns.²³

The mechanisms by which infectious diseases are transmitted in day care settings are fairly well understood. Key environmental factors are the age of the child and the structure of the facility. Typically, children are at greatest risk during their first two years, both because of immunologic and physiologic factors (e.g. related to the development of protective antibodies for certain diseases or eustachian-tube dysfunction among very young children) and because pre-toilet trained children pose special risks that are compounded by a tendency of infants and young toddlers to place their hands and other objects in their mouths. Size of the facility is also important. Most significantly, exposure to

infectious agents rises with the number of children cared for. Increased age-mixing may also play a role, particularly if toilet-trained and non-toilet trained children come into contact with each other (Thacker et al., 1992; Osterholm, 1994; Huskin, 2000).

Less is known about the severity of the resulting health problems. Isolated infections generally have only transitory effects. However, day care attendance is linked to higher incidence of repeated otitis media (middle-ear infections) and recurrent upper respiratory infections, which sometimes have longer-term consequences (Collet et al., 1991; Hardy & Fowler, 1993; Hildesheim et al., 1999). For example, 5 to 10 percent of children with otitis media develop chronic middle-ear disease, often leading to short- or long-term hearing loss (Schwartz et al., 1994). Center-based care has also been linked to increased risk of pneumococcal disease and cytomegalovirus infection. The first of these is an important cause of serious illnesses including pneumonia, septicemia, and meningitis (Takala et al., 1995). The second is usually not harmful to the child but if passed on to child care workers or mothers who then become pregnant is the leading cause of viral birth defects and a major cause of severe multiple birth defects (Dobbins, et al., 1994). Finally, respiratory tract infections and gastroenteritis impose direct costs in the form of frequent physician and hospital visits (Bell et al., 1989) and often require a parent to take time off work to care for the child.

Surprisingly, increased early incidence of infectious diseases occurring in day care may also have positive effects. Most importantly, several recent studies suggest that the higher rates of respiratory illnesses among infants and toddlers may reduce asthma, allergies, or related morbidities at later ages (Ball et al., 2000; Infante-Rivard et al., 2001; Celedón et al., 2002; Krämer et al., 1999; see also Ball et al., 2002). The hypothesized mechanism for this protective effect is that exposure to the micro-organisms stimulates the immune system, leading to reductions in asthma and atopy (allergies). This seems plausible and receives support from evidence that children in large families (who are also more exposed to infectious diseases) are less likely to be asthmatic. However, the research results are not unequivocal (see, for instance, Nystad et al., 1999; Nafstad et al., 1999). Finally, selection of relatively healthy children into day care may lead to a spurious appearance of health improvements, as discussed below.

Research on non-infectious diseases is more limited. Kaila and Taback (2001) conduct a meta-analysis on type I diabetes and conclude that nonparental care may have a weak protective effect but that there is considerable uncertainty about this.²⁴ Conversely, Moon et al. (2000) find that child care is associated with higher risk of sudden infant death syndrome, possibly due to an increase in prone sleeping position among infants used to sleeping supine or on their side. These effects are more pronounced for children in family day care (rather than centers), possibly reflecting the poor training of providers in this mode.

Health problems (or benefits) associated with early day care could also affect other aspects of child development. Particularly interesting is evidence by the NICHD ECCRN (2001) confirming the link between child care and infectious diseases but indicating that these illnesses do not reduce future language competence or school readiness.

The aforementioned research generally includes some controls for confounding factors but these are unlikely to fully account for the selection into day care. In particular, limited information is usually included on health status during infancy. This is important because women with unhealthy children are less likely to be employed and utilize day care (Norberg, 1998; Neidell, 2000; Ermisch and Francesconi, 2001). Disproportionate use of ECEC by relatively healthy children implies that the related increases in infectious diseases or other health problems are likely to be understated. Conversely, at least some of the observed reductions in future asthma/allergies or diabetes might reflect this selection process, rather than a true protective effect of nonparental care.

Preschool and early school enrichment programs, such as Head Start, might affect health differently than other early day care experiences.²⁵ Therefore, it is distressing that, despite the explicit focus of many such programs on providing health-related services to children, few assessments of them have measured health benefits in either the short- or long-run (Karoly et al., 1998). What limited evidence is available provides no indication that these programs improve health. Currie and Thomas (1995) exploit sibling-differences to hold constant difficult-to-observe components of family backgrounds when analyzing Head Start. They uncover no evidence that participation leads to health improvements as

measured by child height-for-age or immunization rates.²⁶ Similarly, assessments at 3, 5, and 8 years of age, for the Infant Health and Development Program (a random assignment intervention for low-birth weight infants) fail to show any gains in health from participation (McCarton et al., 1997). However, this result could be contaminated because both the treatment and control groups received health services.

Unintentional injuries are the leading cause of death among 1-4 year olds in the United States (Anderson, 2001). Therefore, we might be particularly concerned if children placed in day care have higher rates of accidents. The available evidence suggests that this is unlikely. Rivara et al. (1989) and Kopjar and Wickizer (1996) uncover lower injury rates in center-based than parental care.²⁷ One difficulty is in defining the denominator over which the rates are calculated. A careful recent analysis by Currie and Hotz (2001) confirms lower injury rates in center-based care and indicates that accidents decline with the quality of care. Particularly interesting is their finding that regulations requiring providers to have at least a high school education are associated with substantial reductions in injuries. Similarly, there is little evidence of differences in the severity of injuries across modes of care. However, the types of injuries do differ with falls and other accidents involving other children (such as bites) being more common in day care centers (Rivara and Sacks, 1994). Conversely, home accidents more often involve burns, foreign bodies, or poison (Rivera et al., 1989).

d. Summary

Although researchers have not examined how ECEC disparities in early childhood contribute to social and economic inequality in the longer term, a substantial body of research suggests that such a relationship is plausible. Experimental and nonexperimental research provides evidence that children experiencing high-quality, developmentally appropriate care fare better in the domains of cognitive development and school readiness than those receiving poor quality or only informal (non center-based) care. Carefully controlled studies suggest these impacts are modest on average but also that children from the most disadvantaged backgrounds benefit (suffer) disproportionately from high (low) quality. ECEC has little effect on children's overall socio-emotional development but early age of entry and long hours of care may heighten risks of behavior problems; quality of care appears to be an important moderating

factor in this association. The health effects also generally appear to be modest and dependent on the age of the child, mode of care, and quality of ECEC provided.

Understanding the long-term associations between inequalities in ECEC and inequalities in child and adult outcomes poses both the most challenging and the most potentially important research questions. The two major questions here are the following:

- Do the effects of ECEC on cognitive, socioemotional, or health outcomes differ systematically by type of care? For instance, does center or school-based care for 3 or 4 year olds promote children's school readiness? Is informal care better for younger children? Would policies that promote the use of center or school-based care improve outcomes for some children?
- Does the quality of care matter for children's outcomes and if so, what aspects of quality matter, for what children, and for what outcomes? What role can policies play in improving quality and in improving outcomes for children?

Part III: The Role of Government

Federal and state governments intervene in the mostly-private ECEC market in two ways. First, they directly supply some forms of care, as well as providing subsidies and tax benefits that reduce the out-of-pocket costs of purchasing private care. Second, quality regulations, mostly at the state level, set minimum standards for health, safety, and some features of process quality. Public policies governing ECEC have changed substantially in recent years but whether these changes have reduced or actually exacerbated the various forms of inequality in ECEC remains largely unknown.

a. Policies to Increase Access/Reduce Costs

Federal and state governments support a three-track system for increasing access and reducing the costs of child care: compensatory early education programs, means-tested child care assistance, and tax benefits. Over the past three decades, federal commitments to these policies have grown and changed markedly in distribution. As shown in Figure 5, tax expenditures (for child care tax benefits) constituted the single largest federal ECEC investment throughout the 1970s and 1980s. Conversely, investments in

compensatory education dominated federal spending in the early 1990s but they were soon overtaken by expenditures for means-tested subsidies for welfare- and working-poor families. Each of these policy approaches has different implications for ECEC inequalities.

Compensatory early education programs are most explicitly targeted at reducing inequality. These programs aim to increase consumption of high quality care among poor families and to decrease the human capital deficits (or increase the school readiness) of poor children. Head Start remains the single largest compensatory early education effort. As detailed in Table 6, federal appropriations for Head Start totaled nearly \$5.3 billion in 2000 (Administration for Children Youth and Families, 2002). In recent years, states have taken the lead in expanding early education programs. Public kindergarten for 5 year olds is nearly universal, although only half the states fund full-day programs. Thirty-six states now provide funding for pre-kindergarten services, totaling almost \$2 billion in 2001. Most public pre-kindergarten programs target children at economic or educational risk, although six states have extended eligibility to all 4-year olds, regardless of risk status.

Means-tested child care assistance reduces the cost of nonparental care for low-income families by subsidizing private, market-based child care arrangements. The federal government currently funds means-tested assistance through three block grants to the states. States supplement federal funds to assist families through direct contracts with private providers or (more commonly) through vouchers or other mechanisms that reimburse private providers or parents for the cost of services. Federal and state funding for means-tested assistance has grown sharply in recent years as a result of welfare-reform policies. Federal investments in the three block grants combined approached \$7 billion in 2000 (Gish 2002), constituting 42 percent of all Federal ECEC investments (see Table 5).

The single largest federal block grant is the Child Care and Development Fund (CCDF). States can use CCDF funds to serve working families with incomes up to 85 percent of the state median (although many set a lower threshold). States must offer parents a choice of care types and providers but are free to set parental co-payments, provider reimbursements, and procedures for establishing and recertifying eligibility. The second major funding stream for means-tested assistance is the Temporary

Assistance to Needy Families (TANF) block grant, which replaced the Aid to Families with Dependent Children (AFDC) program in 1996. States may transfer up to 30 percent of their TANF funds to the CCDF program, and about half the states commit some TANF funds to CCDF (Gish 2002). States can also use TANF funds directly to provide child care (largely through vouchers) for welfare-reliant families who are preparing for work and for employed current and former welfare recipients. The Social Services Block Grant (SSBG) is the third and smallest source of federal child care assistance for poor families. In 1999, approximately 13 percent of SSBG funds were used for child care services or vouchers (Gish 2002).

Tax benefits (which include both deductions and credits) are the third major form of child care assistance. Under the federal Child and Dependent Care Tax Credit (CDCTC), parents may deduct a portion of out-of-pocket child care expenses from their taxable earnings. Tax expenditures for the federal credit were the single largest federal ECEC investment throughout the 1980s and totaled nearly \$3 billion in 2000 (Statistics of Income Bulletin, 2001.) Over half the states provide additional tax credits, usually calculated as a portion of the federal benefit (National Women's Law Center 2001). Families working for a participating employer may elect to use, instead, Dependent Care Assistance Plans (DCAP) to deduct child care expenses from their taxable income; DCAP tax expenditures were estimated to total about \$1 billion in 1999 (Blau 2001).

b. Policies to Increase Child Care Quality

Child care quality depends on a variety of factors including health and safety characteristics (such as cleanliness of the setting), structural factors (like the number of children cared for and the staff-to-child ratio), and the characteristics of providers (e.g. the type and quality of their interactions with children). Government policies regulate these features directly in only the minority of programs operated under public auspices. For the majority of arrangements, government provides largely *post hoc* control through licensing of private providers.

The direct provision of ECEC services provides government the most explicit control over service quality. The Federal Head Start program, in particular, sets national performance standards for

curriculum, staff training, and other features of care. Quality standards are more variable in state-level early education and pre-kindergarten programs. Staffing ratios are generally more stringent for pre-kindergarten programs than for private child care centers. Nevertheless, only 19 states require pre-kindergarten teachers to have the same educational preparation as kindergarten teachers (Education Weekly 2001).

Public regulation of child care quality in private programs is generally a weaker tool for controlling service quality. There is some evidence that the service dimensions regulated in most states, e.g. staffing ratios and provider education, are relevant. For example, researchers from the NICHD ECCRN (2002) conclude that both staff training and caregiver:child ratios influence child outcomes through their effects on process quality. But licensing, quality standards, and enforcement vary substantially from state to state. Although all states require the licensing of some child care centers, many exempt certain settings, such as religious centers in 12 states and half-day nursery schools in 20 (Helburn and Bergman, 2002). Licensing of family child care homes is even more inconsistent. Only 11 states require all family child care homes to be licensed; others exempt providers caring for only a few children or those not receiving public funds (Helburn and Bergman, 2002). Moreover, state resources for enforcing these requirements are generally limited and an unknown number of family child care homes operate illegally even in states that require licensing.

The stringency of standards also varies across locations. State regulations most commonly address health and safety (such as requirements on minimum square footage, immunization, and smoke detectors). Standards for structural features associated with quality are more variable. For example, only 12 states require child care center teachers to have at least a high school education and just 29 require family child care providers to have any pre- or in-service training (Children's Foundation, 2000). Gormley (1995; 1999) finds that centers provide higher quality care when subject to more frequent inspections. But standards are enforced through unannounced inspections for both centers and family child care homes in only 17 states.

The effect of post-hoc regulation on ECEC costs raises other complexities with respect to reducing income-related inequalities in quality. In purely public programs, the government absorbs the costs of structural improvements such as higher staff training and compensation. Conversely, in private care these costs are passed on to consumers. Economic theory predicts and empirical research confirms that some parents respond to the expense associated with stringent child care regulation of private arrangements by substituting less-expensive forms of care of care (e.g. Blau and Hagy 1998; Currie and Hotz 2001; Powell 2002). As Currie and Hotz (2001) observe in their study of accidental injuries in child care: “regulation creates winners and losers: some children benefit from safer environments while those who are squeezed out of the regulated sector are placed at higher risk of injury” (p. 1).

c. Implications of Government ECEC Policies for Inequality.

Of the three major types of ECEC programs, compensatory education programs have the most direct implications for short-term income inequality. By reducing the cost of care to zero for participating families, they provide access to care that is designed to provide developmentally and educationally enhancing experiences for poor children. The effects are limited, however, by the lack of universal enrollment for those that are income-eligible. Nationwide, only about one-half of eligible three to four year old children receive Head Start services (Butler and Gish 2002). Variation across states is also substantial: as of 1999, the share of children under six who were enrolled in some form of early education – including Head Start, kindergarten and pre-k programs – varied from 12 to 33 percent (authors’ calculation using data from National Center for Educational Statistics and Current Population Survey).

Public compensatory and early education programs may also reduce SES-related quality differentials. In general, public compensatory education programs set quality standards that exceed those imposed by state licensing standards (Education Weekly 2001). The enrollment of low-income children in more highly-regulated, compensatory public programs is the most often cited explanation for the finding that child care center quality tends to be relatively high for the poorest families (compared to near-poor families whose incomes may be too high to qualify for such programs).

Means-tested subsidies also target low-income families but may have limited effects due to low levels of coverage and benefits. As with compensatory and early education, their total effect also depends on the number of families assisted. At current funding levels, the impact is probably modest. By recent estimates only about 15 percent of income eligible families receive assistance nationwide, with the proportion varying from 6 to 25 percent across states (U. S. Department of Health and Human Services, 2000; Schumacher et al. 2001). The effect of subsidies on child care use also depends on the structure of the assistance, with substantial state-to-state variation observed in the types of care subsidized, level of reimbursement to providers and family co-payments (Meyers et al. 2002; Adams, Snyder and Sandfort 2002; Collins et al. 2000; Crosby, Gennetian & Huston 2001).

We know little of the role played by subsidies in reducing SES-related differentials in quality or children's school-readiness. Although increased purchasing power would be expected to raise the quality of care purchased, few studies have examined whether the quality of care obtained by low-income children actually improves. This is salient because child care subsidies generally impose few restrictions on the quality of care children received. Although states may provide a portion of child care services through direct contracts with providers (where quality levels can be specified) they must also make available vouchers that allow families to purchase care from any provider meeting state regulations and licensing standards or legally exempt from these requirements (Federal Register-Child Care and Development Fund Final Rules). The quality of care provided through means-tested benefits is further constrained by low state reimbursements of providers: 22 states set reimbursement levels below the federally-recommended level of the 75th percentile of prevailing local rates (Children's Defense Fund (2001). These and other program rules may force subsidy-reliant families into less formal and lower quality care.

Although child care tax credits, the third major type of child care policy instrument, are often criticized as "middle class" entitlements that exacerbate rather than reduce inequalities in child care access and cost burden, their actual impact is complex. The benefits are used more heavily by higher-income families who are most likely to pay for their child care (Gentry and Hagy 1996). However, while

take-up is tilted toward more affluent families, the size of the benefit declines steadily with income. This progressivity is limited, nonetheless, because credits are nonrefundable and the lowest earners (with zero tax liability) are eligible for no assistance. Gentry and Hagy (1995) consider the combined effects of benefit take-up and benefit structures in the CDCTC. Controlling for employment status and use of paid care, they find that take-up of the credit is similar among lower- and higher income families but that the credits provide no assistance to the bottom 10 percent of the income distribution and are regressive in the bottom quintile of incomes (but slightly progressive for the remainder of the distribution). Moreover, they conclude that overall benefits are too small (averaging about 1.24 percent of family income) “to influence the income distribution dramatically” (p. 2).

d. Summary

Public funding for ECEC has expanded in recent decades at both the national and state levels. The implicit priorities of public ECEC funding have also changed. Means-tested subsidies now account for about 40 percent of federal ECEC spending, nearly as much as compensatory education (about 30 percent) and tax benefits (about 20 percent) combined. State-to-state variation in ECEC financing and policy has also increased with the devolution of federal policy authority (e.g. through the creation of child care block grants) and the growth of state-based programs (e.g. pre-kindergarten). States vary in the relative emphasis of spending for compensatory education and subsidies, in the rules governing eligibility for and benefits through these programs, and in the rigor and enforcement of quality regulations.

Policy structures, trends, and state-level variation raise a number of questions about how government interventions influence the distributions of ECEC services, quality, and costs:

- How do investments in means-tested child care subsidies, compensatory education, and tax benefits influence SES-related disparities in the types and quality of care children receive? How do they influence variation in the ECEC cost burden for families at different income levels?
- Have over-time changes in investments in alternate policy tools strengthened or weakened the equalizing effects of government policy, given concurrent increases in wage and income

inequality? Have they offset or exacerbated inequalities resulting from policies increasing the employment of low skilled mothers (e.g. welfare reform)?

- How do states vary in their investments in ECEC and quality oversight? Does this variation influence families' use of various modes and quality of care? Does it influence the cost-burden for families at different points in the income distribution?
- Has state variation in policy and in policy effects grown or lessened over time? With what implications for both income- and geographic disparities?

Part IV: Conclusions

The increase in wage and income inequality at the end of the 20th century has received considerable research attention. Researchers have also described the increase in families' use of substitute care arrangements during these same decades. Despite evidence of persistent income-related disparities in the use of any ECEC, and the type and quality of that care, there has been relatively little attention to the potential links between income and ECEC inequality. These linkages are particularly interesting given evidence that the experience and quality of ECEC may influence children's wellbeing in the short term and cognitive and other development in the longer term.

In this review we have summarized the current state of knowledge about how ECEC may reflect, exacerbate and/or reduce income inequality. Given the lack of direct attention to these issues, our review finds that knowledge is incomplete in many areas and inconclusive in others. This leads us to suggest several avenues for further study.

Research on ECEC expenses suggests that while lower-income families spend less in absolute dollars than more affluent families, this is largely due to their greater reliance on less expensive or even free types of care, such as babysitting by relatives. Even given lower expenses, however, ECEC impose a disproportionately high cost burden on lower income families and this burden may be increasing over time. These costs may also contribute to income inequality by depressing maternal employment disproportionately among lower skilled women. Estimating the magnitude, trends, and consequences of inequality in cost burden is complicated, however, because this burden results from interactions among

resources, need, and choice of care arrangement. Rates of maternal employment, families' use of ECEC, the number of families headed by a single mother, and male and female wages were all changing during the same decades that we observe growth in income inequality. More research is needed to estimate the combined effects of these changes on inequality in cost burden and on the consequences for inequalities in ECEC use and maternal employment.

Greater reliance on informal and free forms of care may help lower income families reduce their child care cost burden. It also produces inequalities in children's exposure to formal and market-based forms of care. A number of researchers have documented income, educational, and ethnic disparities in care arrangements for children under six. One of the few data sources that tracks care arrangements over time suggests that disparities in one of the most important form of care from the standpoint of school readiness – pre-primary programs such as Head Start, nursery schools, pre-kindergarten and kindergarten – have largely disappeared for 5-year-old children but have persisted for 3- and 4-year olds. Analyses of these and other data find evidence of income-related disparities even after controlling for other family characteristics.

Less is known about whether these disparities in care type translate into disparities in quality. More highly regulated forms of care may provide more developmentally enhancing care, particularly for older preschool children, but using mode of care as a proxy for quality is complicated. Some support for this conclusion is provided by econometric research that suggests families substitute formal for informal care when they can afford it and by several child outcome studies that suggest receipt of formal care is associated with higher pre-academic and language skills. Within modes of care, several studies have concluded that, unless they are enrolled in high quality public programs, low income children receive lower quality care than children from more affluent families.

We have suggested that these disparities in type and quality of care may create a “triple disadvantage” for low-income children who are disadvantaged in the home, less likely to receive formal care, and less likely to receive high-quality care even if they do. But the associations among income, mode and quality of care remain uncertain and we know little about how inequalities in quality of care

have changed over time. Research is needed to both document change over time in ECEC disparities and to disentangle the effects of families' needs, preferences, and resources on their mode of care. More work is also needed to clarify the associations between mode and quality of care and to track changes in ECEC quality disparities over time.

Issues of child care quality are particularly germane to questions about inequality because research suggests that the quality of ECEC influences early childhood outcomes and school readiness. Research suggests at least three avenues through which quality affects child wellbeing and outcomes. First, both experimental and non-experimental research suggests that ECEC quality is associated with children's cognitive, pre-academic, and language development; some experimental studies suggest that these effects persist throughout later childhood. Importantly, several studies also find that quality effects are strongest for children in low-income poorly educated families, who gain the most from high quality care and experience the greatest harm from low quality care. Second, ECEC quality has been found to moderate the potentially negative effect of early and extensive care experience on children's socio-emotional development. Finally, enrollment in ECEC has been associated with some negative health outcomes (e.g. increased frequency and possibly severity of infectious diseases), along with some benefits (including lower rates of asthma and accidental injuries). Although research on the role of quality in health outcomes is limited, there is some indication that lower quality care is associated with greater risk, e.g. though large group sizes, poor health practices, and low provider training.

Evidence that quality of care matters for children's cognitive, socio-emotional, and health outcomes gives particular urgency to issues of ECEC inequality. Researchers have demonstrated that more highly disadvantaged children benefit disproportionately from high quality care but that these same children are less likely to receive nonparental and formal care and are more likely to experience lower quality of care. Additional research is needed to clarify these inequalities and their consequences on children's short-term wellbeing, children's long term development, and on income inequality in a subsequent generation.

The size, persistence, and potential consequences of ECEC inequalities raises questions about the role of public policy. Government ECEC policies address both the availability/affordability and quality of ECEC through compensatory education programs, means-tested subsidies, tax benefits, and quality regulation. The importance of these policies is suggested by studies documenting a “U” shaped distribution in both use and quality of ECEC by income. Although government policies appear to be playing some role in closing ECEC disparities, there has been surprisingly little research on the magnitude of this effect.

Research is also needed to assess whether the influence of policy has grown or diminished in recent decades. Public expenditures for ECEC have grown steadily for more than three decades, but the emphasis of these investments has shifted over time from compensatory education to middle-class tax relief to means-tested subsidies for welfare- and working-poor. The implications of these changes for ECEC inequality are poorly understood. Research is needed on the effect of public policy on inequalities in ECEC cost burden and on whether policies have reduced (or exacerbated) these inequalities during recent decades as employment increased, and income fell, in families headed by lower-skilled adults. Related questions concern differences in the effect of alternative policy instruments on disparities in the use, type, and quality of care. Given differences in policy effects, e.g. between compensatory education and means-tested benefits, research is needed to sort out how these effects may have changed over time given changing economic and demographic conditions. As income inequality grew at the end of the 20th century, we would like to know whether changes in government policies offset or exacerbated the consequences for poor children through their effects on families’ access to high quality care.

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Endnotes

¹ Unless otherwise noted, our statistics on child care usage are calculated using data from the 1999 (most recent) release of the Survey of Income and Program Participation (SIPP). The SIPP has been tracking child care usage since 1985. Originally limited to families with employed mothers, its child care module is now administered to all families with children. Its “Who’s Minding the Kids?” reports provide a comprehensive overview of child care use in the U.S. (see Smith, 2002, for the most recent published report, which uses data from 1997). Some caution must be exercised in using the SIPP to track changes over time because of changes in the survey questions and timing. Most importantly, the survey was historically administered in the fall, but is now administered in the spring and early summer.

² For example, see Katz and Autor (1998), Ellwood and Jencks (2001), or Economic Report of the President (1998).

³ The numbers for Tables 1 and 2 come from several tables in Hofferth et al. (1991) and additional extrapolations used to fill in the table required assumptions about (1) hours of primary care for the youngest child for non-employed mothers who pay for care, (2) the distribution of hourly expenditures for primary care for non-employed mothers who pay for care, and (3) the mean earnings for each income quintile. In future work, we plan to update these calculations using data from the 1999 SIPP, which have only recently become available.

⁴ Unless otherwise noted, all dollar amounts in this paper are in 2000 dollars.

⁵ Other sources of data are consistent with these results (see, e.g., Smith (2002) and Giannarelli and Barsimantov (2001).)

¹⁰ Hofferth et al. (1991), Smith (2000, 2002), Anderson and Levine (2000), and Giannarelli and Barsimantov (2000) provide estimates of the child care burden that incorporate differences across groups in child care costs.

¹² Anderson and Levine (2000), U. S. General Accounting Office (1994), Han and Waldfogel (2002) and Connelly and Kimmel (1999) find that the employment of less skilled, unmarried, or low income mothers is more sensitive to child care costs.

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¹⁴ Estimates of child care arrangements from various data sources should be compared only with caution, due to differences in question wording, timing of data collection, and coding categories. (see also note 19).

¹⁵ These figures and the ones that follow refer to the share of children using center-based care as their primary child care arrangement. Since many children are in multiple arrangements, the share of children using any center-based care is higher. This is shown in the final column of Table 5.

¹⁶ The October CPS began collecting data in 1964, but the microdata for 1964-1967 are not readily available. The 2000 year data were the most current available at the time the analysis was conducted.

¹⁷ From 1968 to 1984, the survey question asked: “Is ... attending or enrolled in school?” In 1985, the question was changed to read: “Is ... attending or enrolled in regular school?” Then, in 1994, a prompt was added after the question so that the full question now reads as follows: “Is ... attending or enrolled in regular school? (Regular school includes nursery school, kindergarten, or elementary school and schooling which leads to a high school diploma).” The October CPS and the National Household Education Survey find a similar share of 3 to 5 year old children enrolled in pre-primary school programs (for instance, both surveys find 68 percent of children in this age group enrolled in 1999). In contrast, two major child care surveys, the NSAF and SIPP, find a lower share of 3 to 5 year olds enrolled in center or school-based programs; this is likely because these two surveys do not ask explicitly about school programs and also because they interview some families during the summer months when school programs would be closed.

¹⁹ These include the ITERS (Infant-Toddler Environment Rating Scale), used to rate centers serving infants and toddlers, and ECERS (Early Childhood Environment Rating Scale), used to rate centers serving older pre-schoolers.

²⁰ However, NICHD ECCRN (2002) reports preliminary evidence that the effects of center-based care on cognitive and language scores may not be robust to the inclusion of controls for factors associated with selection into care.

²¹ Recent reviews are provided by Lamb, 1998; Shonkoff and Phillips, 2000; Belsky, 2001; and Bornstein et al., 2001.

²² Other studies have not found this association (e.g. Howes, 1988; Crockenberg and Litman, 1991; and Greenstein, 1993).

²³ See, for instance, Chomel et al. (2001) on elevated CMV infection rates, and Hurwitz et al. (1994) and Venczel et al. (2001) on increased hepatitis A diagnoses. See Osterholm (1994) for a useful review of earlier research.

²⁴ The hypothesized mechanism for a protective effect is, once again, that early exposure to infections promotes the development of autoimmune responses that reduce the risk of diabetes.

²⁵ For instance, Randolph (1994) details potential health benefits of child-care in the areas of: screening assessments (e.g. vision, hearing and dental testing), preventive medicine (e.g. immunizations), nutritional assessment and supplementation, the detection of child abuse, and health promotion practices.

²⁶ Immunization rates are slightly higher for Head Start participants than for those not attending pre-school but are no different than for those for children at other (non Head Start) preschools. This raises the possibility that preschool has a positive effect on immunizations, or that these differences are due to nonrandom attendance.

²⁷ Kotch et al. (1997) finds no significant differences.

²⁸ The statistics in this paragraph come from Education Week (2002).

²⁹ Families cannot claim the same expenditures under both the CDCTC and DCAP programs.