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Losing Ground in Early Childhood Education

**Declining Workforce
Qualifications
in an Expanding
Industry, 1979-2004**

ECONOMIC POLICY INSTITUTE



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The Keystone Research Center

Stephen Herzenberg
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2005

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Executive Summary

“Parents can’t afford to pay, teachers can’t afford to stay, there’s got to be a better way.” This is a common sentiment held by professionals in early childhood education (ECE). This study shows that the ECE industry has, indeed, been unable to attract and hold onto qualified teachers over the past two decades.

The qualifications of early childhood teachers matter, first, because high-quality early childhood education improves long-term academic outcomes for children and delivers benefits to the community that far exceed initial program costs; and, second, because high-quality ECE requires educated and experienced teachers.

There is growing concern across the United States about the increasing difficulty of recruiting and retaining experienced and educated workers in ECE. Despite this concern, no data have existed on how the educational qualifications of early childhood educators are changing over time. This study fills this vacuum by extracting data on the ECE workforce from the 1979-2004 Current Population Survey (CPS). Most attention is focused on center-based ECE programs and especially on teachers and administrators, the number of which climbed from about 180,000 in 1983-85 to over 400,000 in recent years.

Educational levels of ECE teachers reached a peak during the early 1980s recession. But beginning in 1983, there was a fall in the educational attainment of the center-based ECE workforce that continued until 2001, when slow job growth made more educated workers available to ECE. This study also finds:

- The share of U.S. center-based teachers and administrators with at least a four-year college degree averaged 43% from 1983 to 1985, but only 30% in the last three years.
- Conversely, the share of ECE teachers and administrators with a high school education or less climbed from less than 25% in 1983 and 1984 to around 30% in recent years.
- The education levels of ECE teachers have fallen even further relative to the workforce as a whole, which has become better educated over time. From 1983 to 1985, the share of teachers and administrators with a college degree or more averaged 21 percentage points more than for all workers. Over the last three years, this gap vanished altogether.
- A dramatic demographic pattern exists to educational attainment among ECE teachers that is strikingly different than patterns for all workers. The younger a teacher or administrator is today, the less likely they are to have a college degree. Only a little over a quarter of those ages 24 to 36 have a college degree compared to 36% of those ages 40 to 50 and 43% of those over age 50. These patterns suggest that the industry has found it difficult, since at least the early 1980s, to attract and keep educated young teachers in ECE.
- Education levels are lower in home-based ECE than center-based. Since 2000, only about one in nine home-based early childhood educators has a college degree. Less than half have any education beyond high school.
- Consistently low wages and benefits from 1983 to 2004 help explain the low educational attainment of early childhood educators.
 - The hourly earnings of teachers and administrators in center-based ECE were \$10 in 2002-04 compared to \$19.23 for all female college graduates.¹
 - From 1984 to 1997 the wages of teachers and administrators rose only 43 cents per hour compared to an increase of \$2.63 per hour for female college graduates. Most of the fall in the education levels of teachers and administrators took place during 1984 to 1997.

- Center-based early childhood educators are less than half as likely to get health care through their job as other workers (28% versus 66%), and they are three times as likely to lack health insurance altogether (21% versus 7%).
- Only a third of center-based teachers and administrators get health care through their job and only a fifth participate in any kind of pension plan.
- A quarter of center-based teachers and administrators have incomes below 200% of the poverty line, compared to one in five for all workers and one in 14 for all female college graduates.

The story that emerges from the data is that the position of ECE in the labor market has changed for the worse since the early 1980s. Center-based early childhood education began as a small industry with a highly selective workforce. Today, center-based ECE has more than doubled in size and female college graduates have more opportunities in other fields and greater economic aspirations. Increasingly, center directors must hire less-qualified teachers.

The challenge of maintaining a qualified early childhood workforce will grow more difficult in the years ahead. Today 49,000 of center-based teachers and administrators are 45 or over and thus likely to retire in the next 20 years. As the industry's most educated group retires, the field must replace these highly qualified workers as well as attract new ones to keep pace with industry expansion.

If the United States wants children to receive high-quality early childhood education that provides a foundation for success in school and life, it must reverse the decline in the qualifications of early childhood teachers. For the children and families who depend on ECE, and for the United States as a whole, this investment will pay dividends in the generations ahead.

Introduction

Research shows that high-quality early childhood education (ECE) programs improve outcomes for children in school and in life, translating into large benefits for the community (see below). Research also demonstrates that the quality of ECE hinges on teacher experience and qualifications. In light of the research evidence, concern has grown across the United States about the difficulty of attracting and retaining experienced and educated workers in the ECE field. Despite this concern, no data have existed that tracked the educational qualifications of early childhood educators over time.

Researchers have cited the absence of data as a central reason for lack of knowledge about the ECE workforce. For example, Burton et al. note that “available data sources have offered little information about the size and composition of this complex [ECE] workforce, including educational qualifications and other demographic characteristics” (Burton, Whitebook, et al. 2002). Saluga, Early, and

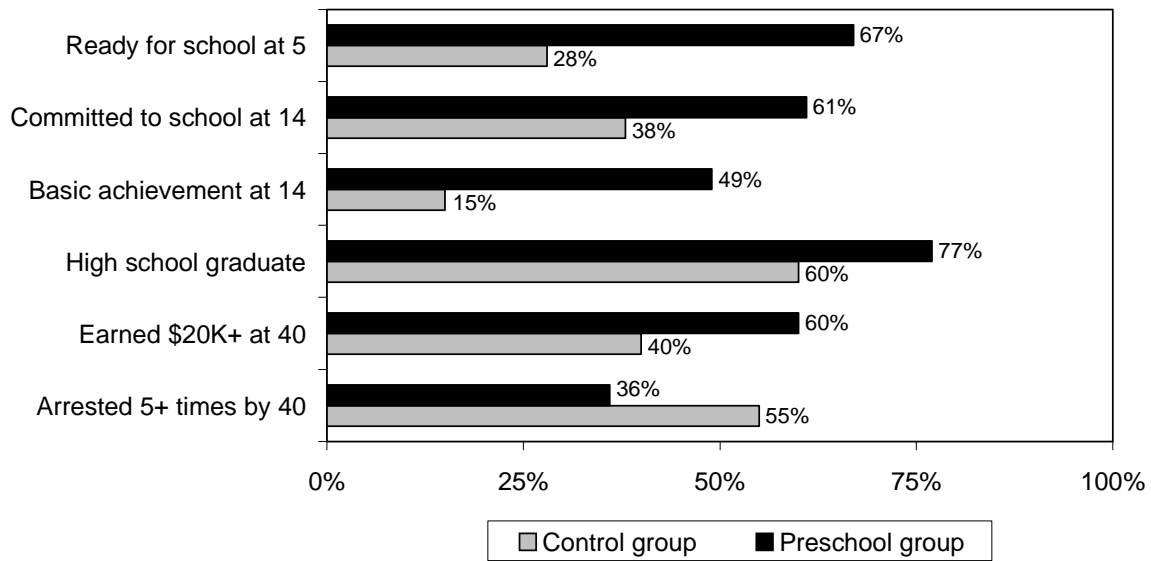
WHY THE EDUCATION LEVEL OF EARLY CHILDHOOD EDUCATORS MATTERS

The backdrop for this project includes research demonstrating two inter-related findings: (1) the long-term benefits of high-quality early childhood education programs to children and to society; and (2) the importance of more qualified staff to achieving those long-term benefits. High-quality early childhood education programs improve reading, arithmetic, and language abilities (Lynch 2005). Children enter elementary school better prepared to learn, need less remedial coursework or special education, are less likely to be held back a grade or to drop out, and are more likely to graduate from high school. The benefits of ECE continue into adulthood, and include lower crime, lower welfare costs, and higher adult earnings and taxes. **Figure A** shows the long-term benefits from the best-known longitudinal study, the Perry Preschool Project, which randomly assigned 123 low-income African American three- and four-year olds into a preschool group (58 children) and a control group (Schwinhart 2003). Teachers in the Perry Preschool Program had bachelor’s degrees and certificates in education. Successive follow-up studies, which have now tracked both groups to age 40, have shown differences in achievement that have grown over time. The most recent evaluation estimates a return to society of \$17 for every tax dollar invested in the preschool program. A larger-scale project, the Chicago Longitudinal Study, followed over 1,000 children in preschool in 1983-85 and kindergarten in 1985-86 compared to a control group of 389 children. Teachers in the partici-

pating classes all had BA degrees and were certified in early childhood education. The study found that participating children had significantly higher achievement test scores at ages 5, 6, 9, and 14. Based on longitudinal studies, Lynch estimates that the benefits of high-quality preschool programs exceed costs by ratios of 4 to 1 up to 9 to 1 (Lynch 2004). Delivering high-quality early childhood education requires high-level skills and abilities. These include an understanding of how children develop cognitively and socially as well as the ability to translate an understanding of childhood development into classroom activities that will stimulate children. Consistent with the complexity of the work, research demonstrates that high-quality ECE hinges on teacher experience and qualifications. For example, a 2000 National Research Council (NRC) committee found that both overall education levels and training specific to early care and education are related to positive outcomes for children (Bowman, Donovan, and Burns 2000). The value added from a BA degree alone is a subject of continuing research debate.² The research debate indicates not only the need for better longitudinal research focused on teacher qualifications and outcomes, but also the need for BA programs to link effectively with on-the-job experience and mentoring that helps teachers convert knowledge of development into more effective classes. Whatever the results of future research, by all accounts the current level of education of center-based and home-based early childhood educators is too low.

FIGURE A

Perry Preschool Project: outcomes for preschool children and a control group



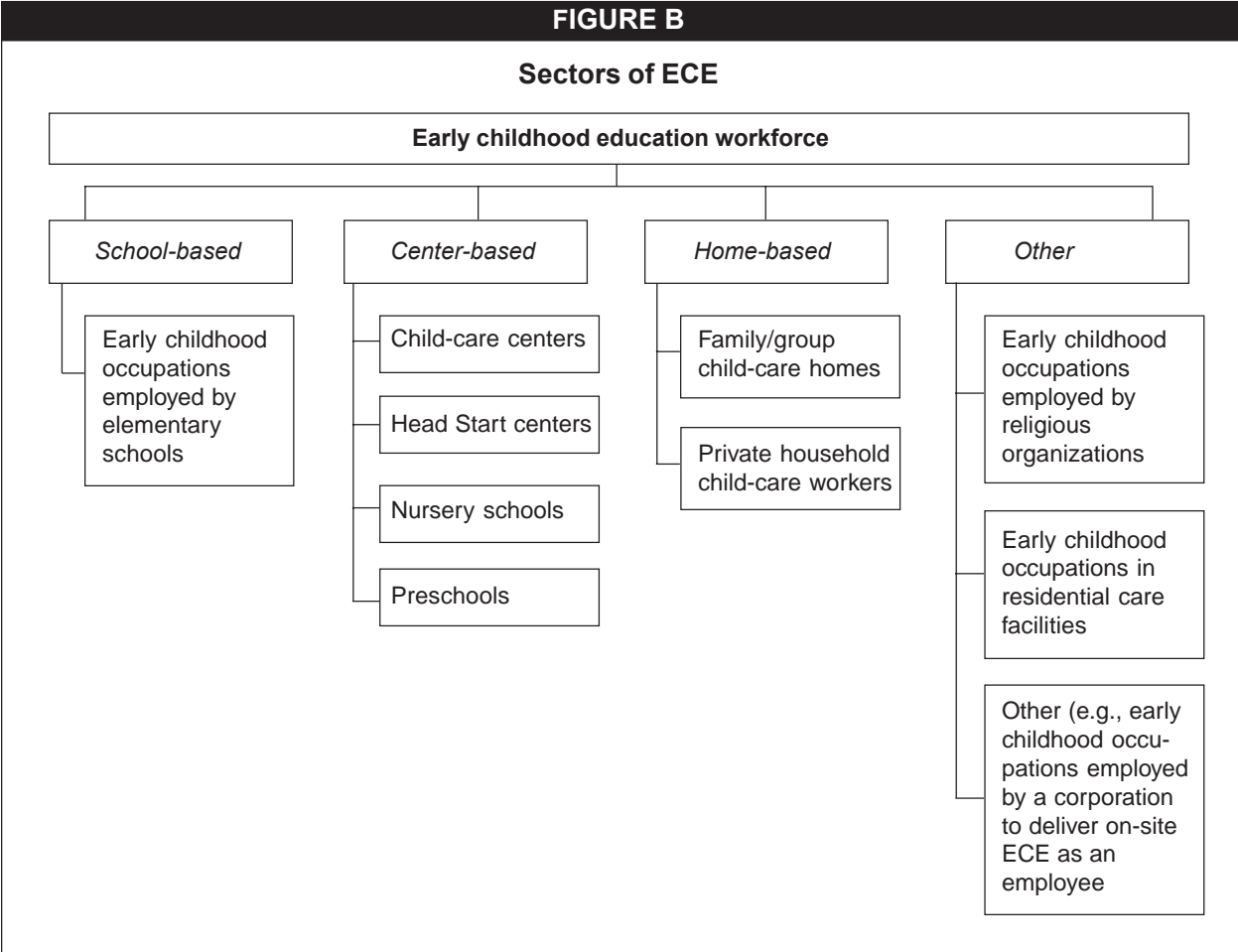
Source: Schwinhart 2003.

Clifford state that “we lack a current profile...of the early childhood workforce.” They later conclude that “Currently, we are lacking an ongoing, systematic method of collecting information on early childhood programs. Further, the information available varies with regard to sampling strategy, making direct comparisons and considerations of changes over time difficult” (Gitanjali, Early, and Clifford 2002).

This study extracts educational attainment data for the past 25 years from the Current Population Survey (CPS), a monthly survey of 60,000 U.S. households. At the national level, CPS samples are large enough to produce statistically significant results. Moreover, the CPS is a better source than the decennial Census for three reasons: it provides data up to 2004 (rather than 2000); it collects data annually rather than every 10 years; and it contains data for up to 10 years at a time without any changes in occupation and industry codes. (In companion state-level analyses, this report does rely somewhat on the Census for sample size reasons.²)

Along with educational attainment data, we also extract figures on wages, benefits, and income trends, which help explain trends in teacher educational attainment. We compare characteristics of the ECE workforce with those of all workers and, in some cases, with those of female college graduates. Since over 95% of center-based teachers and administrators are female throughout the study period, the compensation of female college graduates rather than all college graduates provides the best indicator of what college-educated ECE teachers and administrators might earn in other fields.

This study examines trends at the national level. Companion reports examine trends in seven states: California, Florida, Massachusetts, New Jersey, New York, Pennsylvania, and Wisconsin. In tables available on the Web sites of the Keystone Research Center (www.earlychildhoodworkforce.com)



and Economic Policy Institute (www.epi.org), statistics and rankings are reported on workforce trends in early childhood education in 33 states.

Early childhood education is delivered in a wide range of settings (**Figure B**). These include Head Start programs, nursery schools and other stand-alone preschools, elementary schools, stand-alone child-care centers, child-care centers on the sites of organizations with a primary purpose distinct from early childhood education (e.g., a business, a church), the homes of providers (as with “group” homes catering to large groups of children or family providers serving smaller numbers of children), or in a child’s own home.

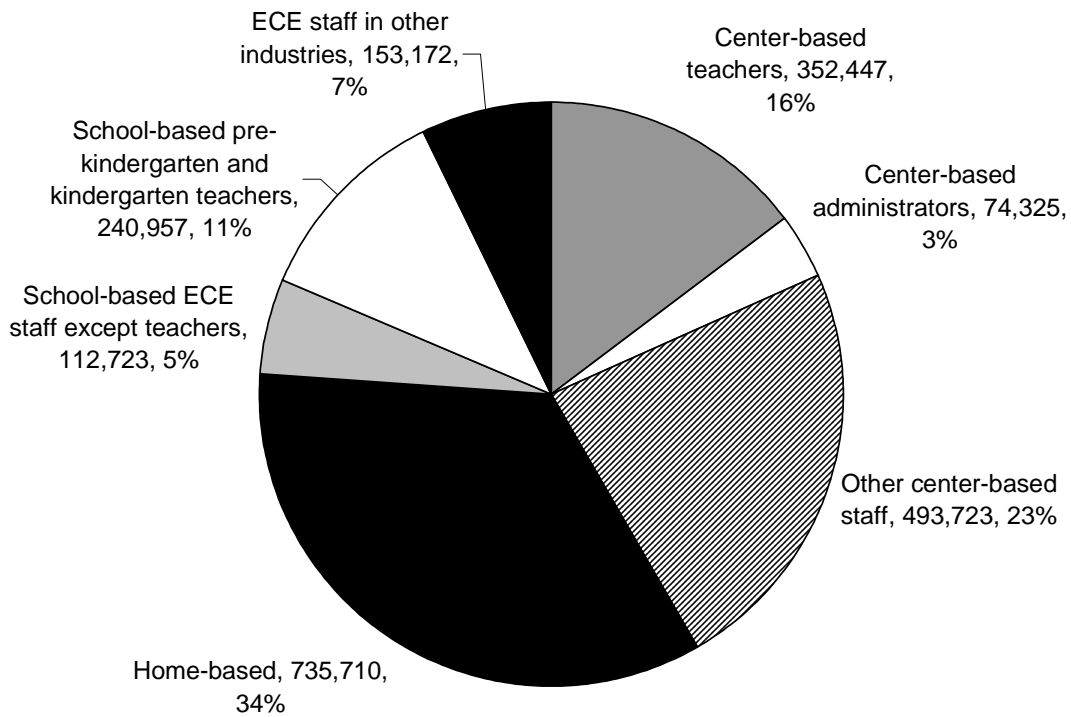
This study focuses most on center-based ECE, for which we construct a 22-year CPS data set (from 1983 to 2004). While the CPS series introduces new industry and occupation codes twice, in 1992 and 2000, there is throughout the entire period a single industry category (child day-care services) that corresponds largely to center-based ECE.⁴ Our center-based ECE includes private and public, for-profit and not-for-profit child-care centers, Head Start programs, and stand-alone preschools and nursery schools. Center-based ECE is distinguished from home-based ECE, school-based ECE, and a residual group of early childhood education occupations not identifiable as part of center-based, home-based, or school-based (Figure B).⁵

TABLE 1
Industry segments and occupations within early childhood education

Center-based		Home-based	All early childhood educators in "other" industries	School-based	
Pre-kindergarten and kindergarten teachers and administrators	Other center-based occupations that deal with children (e.g., teachers, assistant teachers, teachers aides)				

FIGURE C

Employment of early childhood educators, 2004



Source: KRC analysis of the CPS Basic Monthly Survey.

Table 1 shows the occupations in each of the segments of ECE. **Figure C** shows the distribution of the 2.1 million early childhood educators in 2004 among the occupations in different segments of the industry. This study examines four distinct groups of early childhood educators:

- Teachers plus administrators in center-based ECE (through the 1983-2004 period, a single CPS occupation category exists for teachers and another one for administrators);
- All occupations in center-based early childhood education with primary responsibility for children, such as administrators, teachers, teacher assistants, and teacher aides. The specific CPS occupational categories that encompass this set of occupations change somewhat in 1992 and in 2000;⁶
- Teachers in school-based kindergarten and pre-kindergarten programs (within schools there is no way to separate pre-kindergarten from kindergarten teachers); and
- All occupations that deal with children in home-based ECE.

The Technical Appendix details the CPS industry and occupation codes included in the groups above, including how this report dealt with the changes in these codes in 1992 and 2000.

The CPS industry and occupation classifications do not always match the structure of the industry or its jobs.⁷ Careful coding makes it possible to overcome many of the limits of the CPS data, at least for the center-based portion of the industry. As a result, the data plug a gaping hole in understanding of the growing ECE industry and the capacity of its workforce to deliver quality education. The rest of this report reveals the results of the initial mining of this rich data set.

Educational Attainment Trends

This section analyzes educational attainment trends in early childhood education from 1983 to 2004, with a look back to 1979 for one group of ECE and kindergarten teachers. Following a discussion of how the CPS measures education levels, we then examine educational attainment in center-based ECE. The last part of this section summarizes current education levels in home-based ECE.

Methods

Since January 1992, the Current Population Survey educational attainment question asks respondents, “What is the highest grade of school [respondent] has completed, or the highest degree [respondent] has received?”⁸ Prior to 1992, the CPS required respondents to indicate only the highest grade attended and whether or not they had completed that grade, but it did not obtain information on the highest degree the respondent received.

To make comparisons from before and after the change in the education question, this report is forced to make assumptions about the relationship between “years of schooling” (the 1992 question) and the highest degree obtained.⁹ This study assumes that prior to 1992, respondents who report 16 years of schooling completed have a four-year degree.¹⁰ Respondents reporting 13-15 years of schooling completed are assumed to have “some college,” but not a four-year degree. Finally, respondents reporting 17 or more years of schooling completed are assumed to have a post-graduate education.

The report examines five educational attainment categories: less than high school, high school, some college, associate’s degree (available only after 1990 or 1992), and college degree or higher.

It also examines the difference in educational attainment between ECE and the workforce as a whole. Examining differences in educational attainment reduces the importance of the change in CPS educational questions in 1990 and 1992 because any inflation of educational attainment prior to 1992 (when 16 years is assumed to be a four-year college degree) impacts the workforce as a whole as well as ECE.

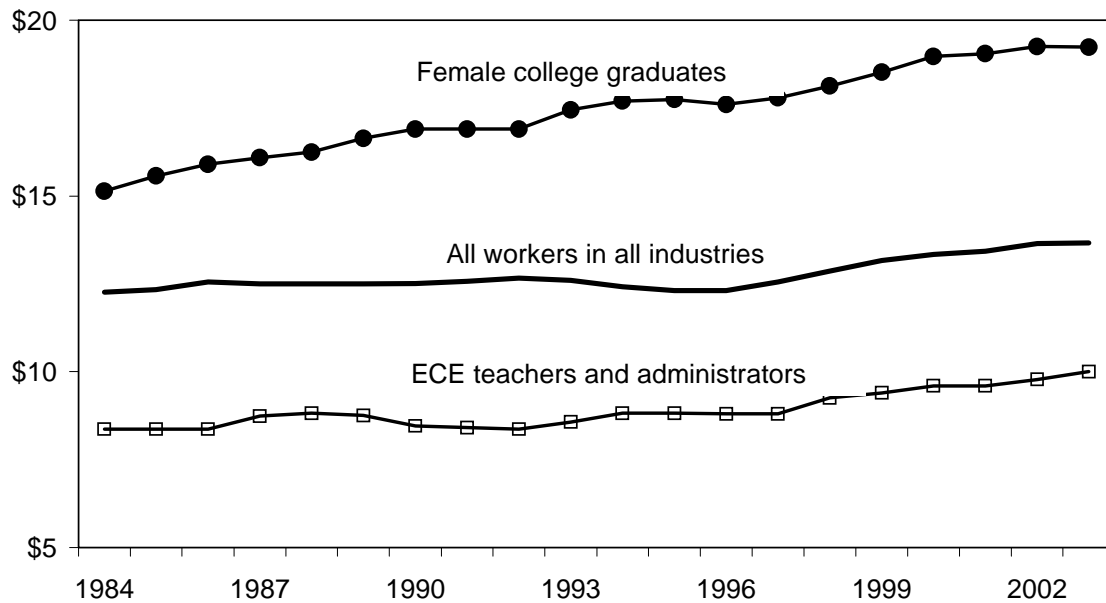
ECE as an industry

In interpreting the numbers below on educational attainment, it is important to keep in mind some basic realities of the ECE industry and labor market. Even with the emergence of some for-profit chains in the industry (such as KinderCare), ECE outside the schools is a highly fragmented and competitive industry, dominated by small firms. Based on the 2004 March CPS, over 80% of employment in center-plus home-based ECE is in firms employing less than 100 workers, twice the employment share in firms with less than 100 workers in the economy as a whole.

In addition, purchasers of ECE are often constrained in their ability to pay higher rates. This is true of the public sector, which subsidizes ECE for low-income children, and of many parents. The inability or unwillingness of consumers to pay more leaves individual ECE providers limited in their ability to respond to labor market shortages by raising prices: doing so risks losing customers to other providers who have not raised rates. Partly as a result, and despite persistent shortages as the industry has expanded over the past quarter century, wages of center-based teachers and administrators have risen little for most of the past two decades (**Figure D**). The financial constraints and industry dilemma that lie behind the fall in educational attainment are summarized by the lament of ECE professionals: “parents can’t afford to pay, teachers can’t afford to stay, there’s got to be a better way.”

Declining educational attainment in center-based early childhood education

Current Population Survey data show that teachers in center-based ECE have become much less edu-

FIGURE D**Inflation-adjusted median hourly wages, 1983-2004**

Note: Inflation-adjusted median wages were calculated based on the CPI-U-RS, 2004 dollars. Figures are three-year averages; e.g., figures for 2002 were produced after pooling observations from 2001, 2002, and 2003.

Source: KRC analysis of the CPS Basic Monthly Survey.

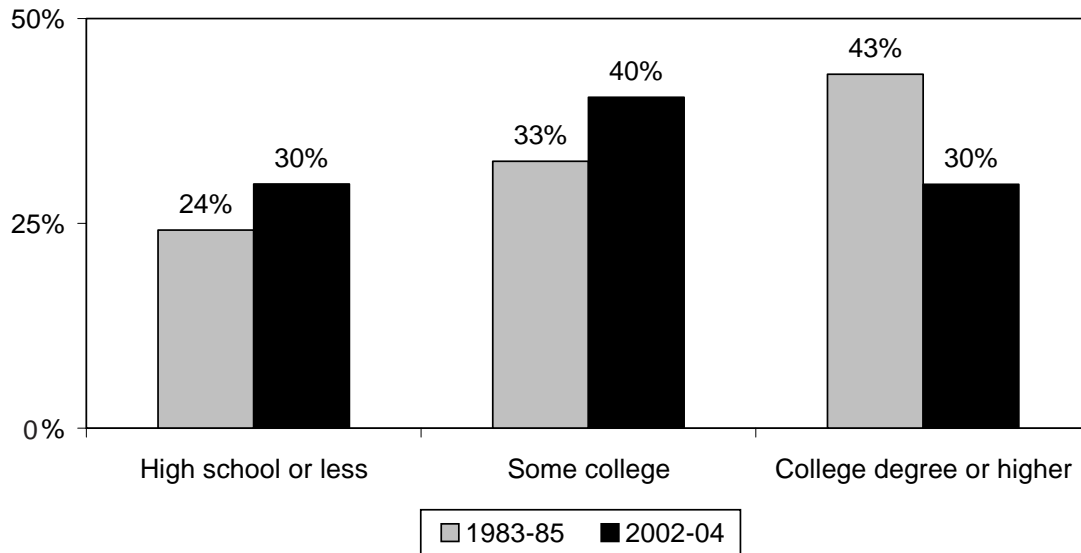
cated. The fall in educational attainment is seen in **Figure E**, which compares educational attainment in 1983 to 1985 and in 2002 to 2004. These two three-year periods are the beginning and end of our data series for teachers and administrators in center-based ECE.

Figure E shows that a smaller share of teachers and administrators have four-year college degrees in 2002-04 than in 1983-85 and a larger share of teachers and administrators have a high-school degree or less in the later period.¹¹ The share of workers in the middle educational attainment category—“some college”—grows but by half as much as the fall in the share of workers with a four-year college degree.

Table 2 and **Figure F** show educational attainment for teachers and administrators in center-based ECE in every year from 1983 to 2004. They reveal that educational attainment has eroded primarily in two periods of falling or low unemployment—1983 to 1986 and the long economic boom from 1992 to 2000. In the 1986-92 period and the 2000-04 period, during which unemployment was stable or rising, educational attainment at both the top (college plus) and bottom (high school and less) fluctuated, but did not show a clear trend.

Table 2 and Figure F show 1983 and 1984 to have higher educational attainment than any other years. Using 1983-85 as the starting point (the first three years we can obtain data on center-based teachers) increases the two-decade fall in educational attainment compared to excluding these years on the grounds that they are higher than all later years. To see if 1983 and 1984 are statistical outliers as opposed to an accurate indicator of education levels in and prior to 1983 and 1984, it is necessary to look at data from earlier years.

Since there is no center-based industry code prior to 1983, this study cannot separate teachers in center-based ECE from kindergarten teachers in elementary schools for the years prior to 1983. (Recall

FIGURE E**Educational attainment teachers and administrators
in center-based early childhood education, 1983 and 2004**

Source: KRC analysis of the CPS Basic Monthly Survey.

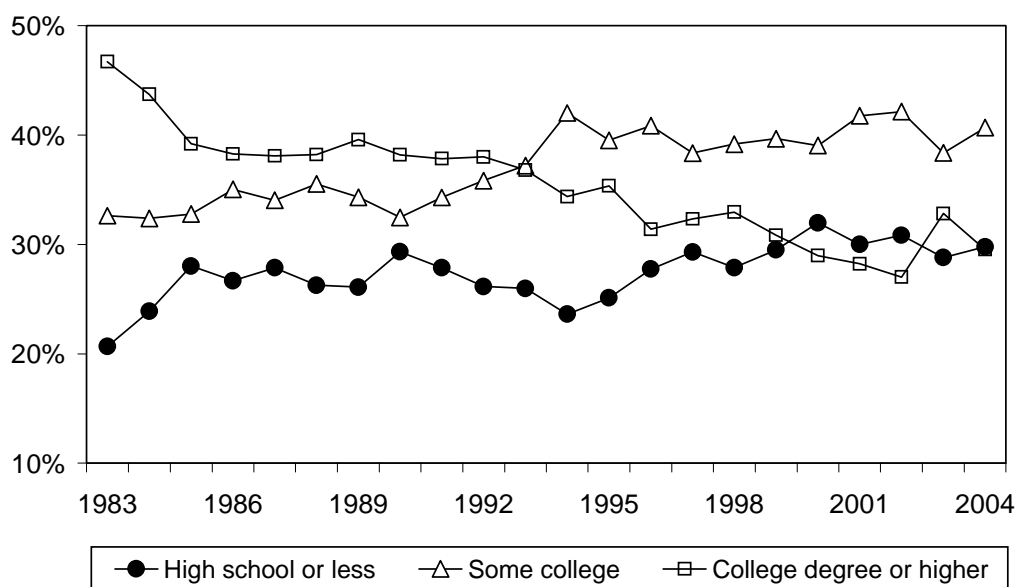
TABLE 2**Educational attainment of teachers and administrators
in center-based early childhood education, 1983-2004**

Year	Less than high school	12th grade	Some college	Four-year plus
1983	3%	18%	33%	47%
1984	5	19	32	44
1985	4	24	33	39
1986	3	24	35	38
1987	5	23	34	38
1988	5	22	36	38
1989	3	23	34	40
1990	3	26	32	38
1991	3	25	34	38
1992	3	23	36	38
1993	5	21	37	37
1994	2	22	42	34
1995	3	22	40	35
1996	3	25	41	31
1997	3	26	38	32
1998	4	24	39	33
1999	5	25	40	31
2000	6	26	39	29
2001	4	26	42	28
2002	5	26	42	27
2003	4	24	38	33
2004	4	26	41	30

Source: KRC analysis of the CPS Basic Monthly Survey.

FIGURE F

**Educational attainment of teachers and administrators
in center-based early childhood education, 1983-2004**



Source: NKRC analysis of the CPS Basic Monthly Survey.

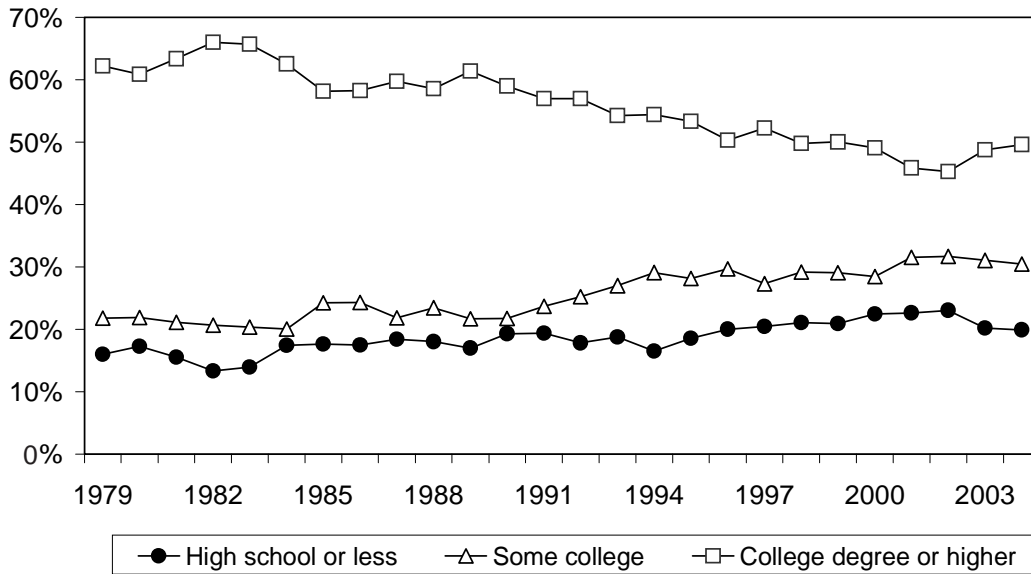
that the occupation is “kindergarten and pre-kindergarten teachers,” hence the need for a center-based industry code, available starting in 1983, to be able to identify which teachers are not in elementary schools; for more detail, see the Technical Appendix.) It can, however, examine a pooled sample of all kindergarten and pre-kindergarten teachers. In this pooled sample, since kindergarten teachers that are part of the public school system are ordinarily required to have a BA, fluctuations in the college degree share are likely the result of fluctuations in the college-degree share among center-based teachers. Thus, if education levels prior to 1983 are at or above the 1983 and 1984 levels, it is likely that education levels among center-based ECE teachers at the time were similar to the 1983 and 1984 levels.

The data show that pre-kindergarten and kindergarten teachers’ education levels from 1979 to 1982 follow a counter-cyclical trend (**Figure G**). As the economy goes into deep recession in 1981, educational attainment begins to climb. Educational attainment reaches a peak in 1982 and falls steadily after 1983 as the economy bounces back strongly. Thus, the 1983 education level for teachers and administrators in center-based ECE accurately reflects the counter-cyclical pattern and is not a statistical anomaly.

Figure H and **Table 3** broaden the lens beyond teachers and administrators in center-based care to show educational attainment among all early childhood educators in center-based care. Education trends within this broader group resemble those for teachers and administrators alone.¹² One difference with teachers and administrators alone is that a sharp rise in the share of all center-based educators with a high school degree or less took place from 1996 to 2000, along with a fall in both the college degree share and the “some college” share. During this period, it appears that centers increasingly had to hire assistant teachers and teacher’s aides with no education beyond high school—and sometimes without even a high school degree. This helps explain the growing sense of urgency about the ECE staffing crisis

FIGURE G

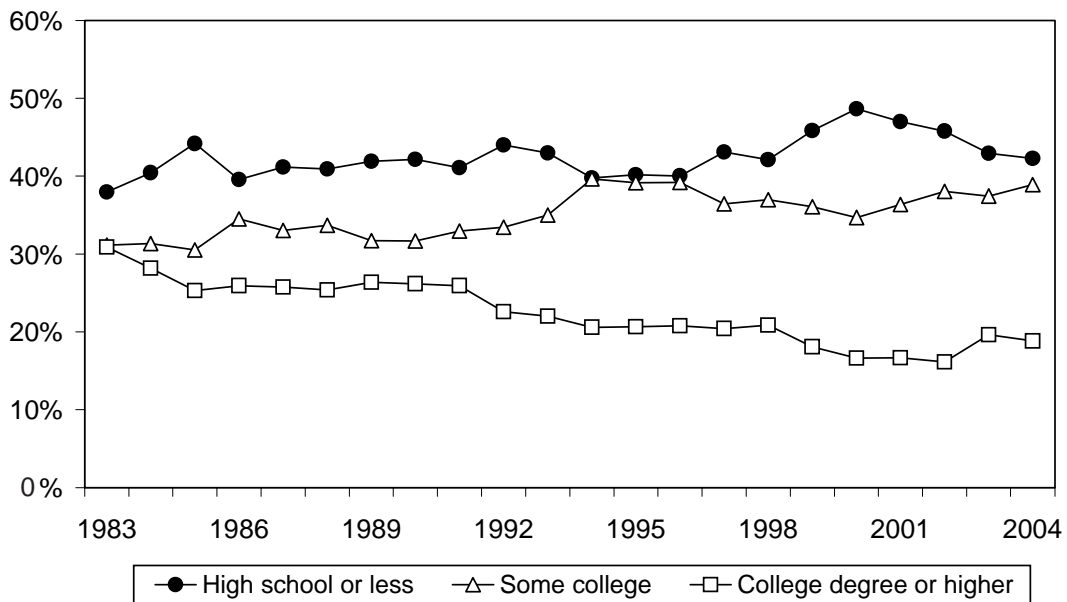
Educational attainment of pre-kindergarten and kindergarten teachers in all industries, 1979-2004



Source: KRC analysis of the CPS Basic Monthly Survey.

FIGURE H

Educational attainment of center-based early childhood educators, 1983-2004



Source: KRC analysis of the CPS Basic Monthly Survey.

TABLE 3
Educational attainment of all center-based early childhood educators, 1983-2004

Year	Less than high school	12th grade	Some college	Four-year plus
1983	11%	27%	31%	31%
1984	12	29	31	28
1985	10	34	31	25
1986	9	31	35	26
1987	11	31	33	26
1988	10	31	34	25
1989	8	34	32	26
1990	8	35	32	26
1991	7	34	33	26
1992	10	34	33	23
1993	10	33	35	22
1994	8	32	40	21
1995	10	30	39	21
1996	10	30	39	21
1997	9	34	36	20
1998	10	32	37	21
1999	11	35	36	18
2000	13	36	35	17
2001	13	34	36	17
2002	12	33	38	16
2003	10	33	37	20
2004	9	33	39	19

Source: KRC analysis of the CPS Basic Monthly Survey.

that emerged in the second half of the 1990s. Since 2000, most of the rise in the share of all ECE educators with no more than high school degree has been reversed. This may, however, be a reflection of slow job growth and thus reverse again if the job market becomes healthier.

The bottom line is that as the center-based industry tripled in size from 1983 to 2004, it was unable to attract highly educated teachers to keep up with the growing need. The number of college-educated teachers and administrators in ECE did rise by about 44,000 between 1983 and 2004, from 82,000 to 126,000. But the number without a college degree grew by 211,000 (from 94,000 to 301,000). Thus, while over 40% of teachers and administrators had college degrees in the early 1980s, only 19% of the increase in number have a college degree.

A sharper decline in relative educational attainment

The decline in educational attainment of ECE workers is all the more remarkable because it has taken place during a period when the education level of workers in the economy as a whole increased. Based on the CPS, for example, the share of all workers with a college degree rose from 22% to 30% between 1983 and 2004, and the share of workers with no more than a high school degree fell from 55 to 41%.¹³

Table 4, Figure I, and Figure J compare educational attainment for teachers and administrators in center-based care with that of all workers.

Since 1983, at the top and bottom end of the educational attainment curve, there has been a 20 percentage-point deterioration in the relative education of teachers and administrators in center-based

TABLE 4
Educational attainment of center-based early childhood teachers
and administrators compared to all workers

Year	Percent with each level of education						<i>Educational attainment compared</i>		
	All workers in all industries			Center-based teachers and administrators			<i>Percentage-point difference, center-based teachers and administrators vs. all workers</i>		
	High school or less	Some college	College degree or higher	High school or less	Some college	College degree or higher	<i>High school or less</i>	<i>Some college</i>	<i>College degree or higher</i>
1983	55%	23%	22%	21%	33%	47%	-34*	9	25*
1984	55	24	22	24	32	44	-31*	9	22*
1985	54	24	22	28	33	39	-26*	9	17*
1986	53	24	22	27	35	38	-27*	11	16*
1987	53	24	23	28	34	38	-25*	10	15*
1988	52	25	23	26	36	38	-26*	11	15*
1989	51	24	25	26	34	40	-25*	11	15*
1990	51	24	25	29	32	38	-21*	9	13*
1991	50	24	26	28	34	38	-22*	10	12*
1992	48	27	24	26	36	38	-22*	9	14*
1993	47	28	25	26	37	37	-21*	9	12*
1994	46	29	25	24	42	34	-22*	13	9*
1995	45	29	26	25	40	35	-20*	10	10*
1996	45	29	26	28	41	31	-17*	12	5**
1997	45	29	26	29	38	32	-16*	10	6**
1998	45	28	27	28	39	33	-17*	11	6**
1999	44	29	27	30	40	31	-14*	11	3
2000	44	29	28	32	39	29	-12*	10	1
2001	43	29	28	30	42	28	-13*	13	0
2002	43	29	29	31	42	27	-12*	13	-2
2003	42	29	29	29	38	33	-13*	10	3
2004	41	29	30	30	41	30	-12*	12	0

* and ** denote significance at the 1% and 5% level, respectively.

Source: KRC analysis of the CPS Basic Monthly Survey.

care.¹⁴ This deterioration drives home how much center-based early education has been losing the competition for more qualified workers as it expanded since the early 1980s. Once a provider of high-quality care to a small number of children, center-based ECE attracted an elite, highly qualified workforce; as ECE became a mass provider of service to the middle class and working people, center directors increasingly found they could only fully staff their centers by hiring individuals with qualifications below those they once thought acceptable.

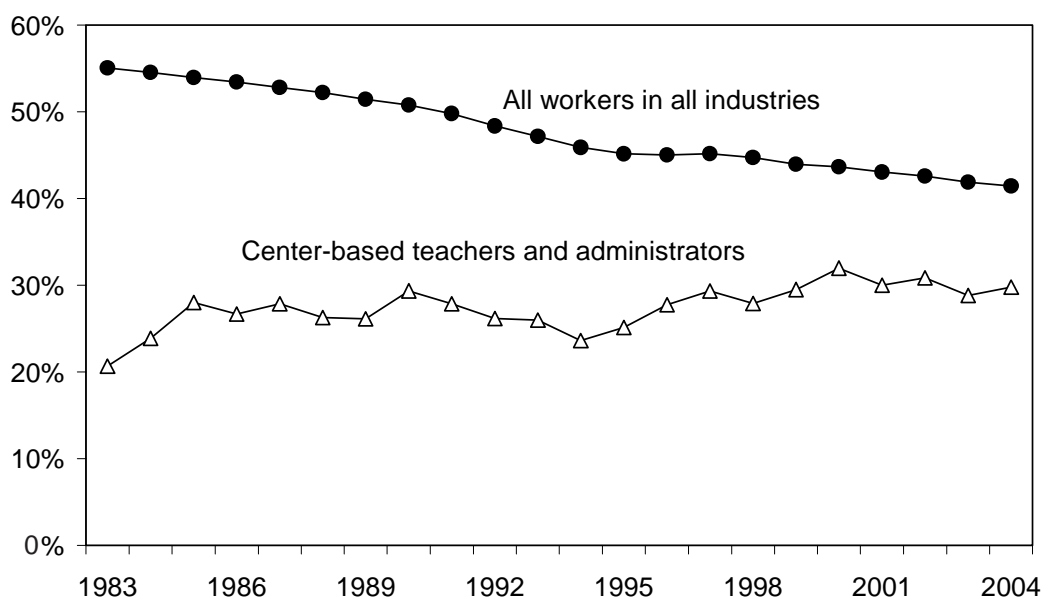
The share of early childhood teachers with sub-baccalaureate education

As it has become harder to attract and retain college-educated teachers, some states have begun to institute policies aimed at training and retaining more early childhood educators with at least education beyond high school. In some cases, these policies help pay for college courses and the acquisition of an associate's degree, as well as to receive bonuses upon acquisition of additional credentials.

The impact of new policies to help experienced early childhood educators acquire more educated teachers can be gauged by using new CPS variables introduced in 1992 that indicate whether workers

FIGURE I

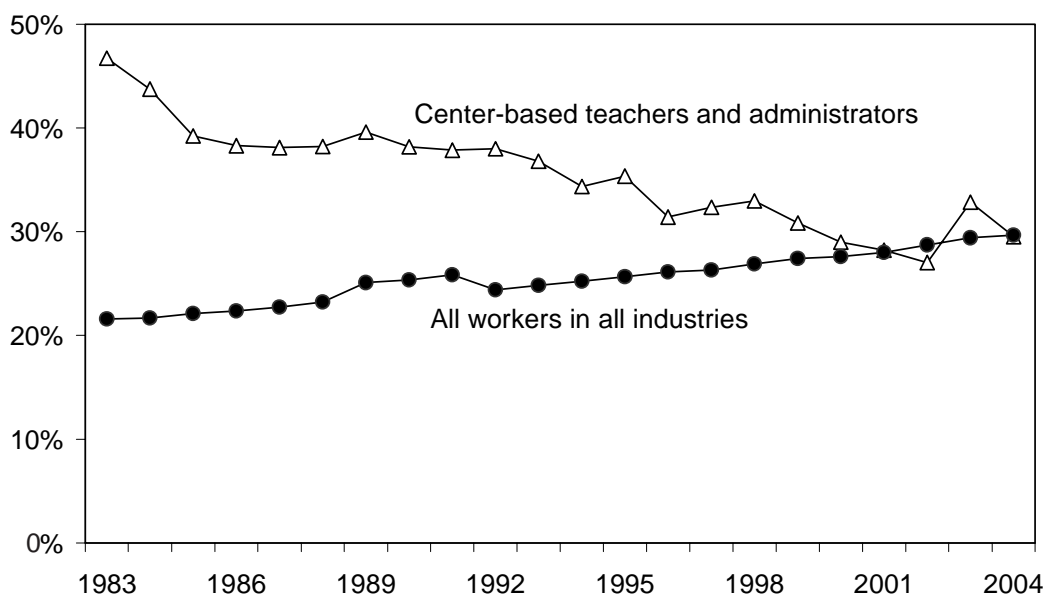
Percent of center-based teachers and administrators and all workers with a high school degree or less, 1983-2004



Source: KRC analysis of the CPS Basic Monthly Survey.

FIGURE J

Percent of center-based teachers and administrators and all workers with at least a college degree, 1983-2004



Source: KRC analysis of the CPS Basic Monthly Survey.

TABLE 5
Center-based early childhood educators and all workers
with some college or an associate's degree, 1992-2004

	Center-based teachers and administrators		All center-based early childhood educators		All workers, all industries	
	Some college	Associate's degree	Some college	Associate's degree	Some college	Associate's degree
1992	25%	10%	25%	8%	20%	7%
1993	27	10	27	8	20	8
1994	31	11	32	8	21	8
1995	28	11	30	9	21	8
1996	28	13	29	10	21	8
1997	25	13	27	10	20	8
1998	29	11	28	9	20	8
1999	26	14	26	10	20	8
2000	26	13	25	9	20	9
2001	29	13	28	9	20	9
2002	27	15	27	11	20	9
2003	27	12	28	9	20	9
2004	24	17	26	13	20	9

Source: KRC analysis of the CPS Basic Monthly Survey.

have an associate's degree. (The data distinguish academic from vocational associate's degrees, but the two are combined here.) **Table 5** shows the share of workers since 1992 with associate's degrees and some college but no degree. There has been a jump in the associate's degree share since the first half of the 1990s, especially among teachers and administrators, albeit the numbers are volatile from year to year.

In future research, the impact of state policies to boost sub-baccalaureate education of experienced ECE staff deserves closer attention. For example, have states with such policies seen a rise in the share of educators with an associate's degree or some college and a fall in the share of educators with a high school degree or less? Has the increase at the associate's degree and some college level exceeded any recent fall in share of educators with a college degree? These could be indicators of policy beginning to counter the fall in the education levels of the ECE workforce.

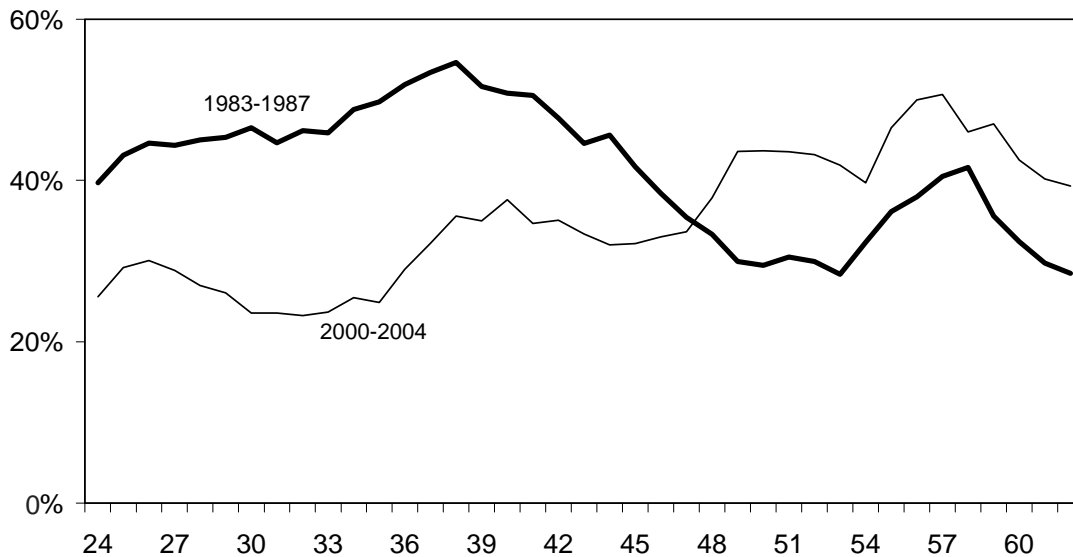
Declining college degree attainment most pronounced among younger workers

The decline in educational attainment among the center-based early education workforce has been most pronounced for workers between 22 and their mid-40s.¹⁵ **Figure K** breaks down by age the college-degree data for teachers and administrators in center-based care in the five years at the beginning and five years at the end of the data period. Each age shown represents a five-year span (i.e., 24 means all workers in the 22 to 26 age range; as with other data pooling, pooling by ages generates more reliable data and smoothes the distribution).

Figure K tells a remarkable story. Based on CPS data, center-based teachers and administrators in their mid-20s to late 40s had a higher college degree share in 1983-87 than in 2000-04.¹⁶ By contrast, teachers and administrators in their late 40s to early 60s had a higher college degree share in 2000-2004.

FIGURE K

Share of teachers and administrators in center-based early childhood education with at least a four-year college degree, by age



Note: Each age represents a five-year span centered on the year of the label, i.e., 24 represents all workers in the 22-26-year-old range.

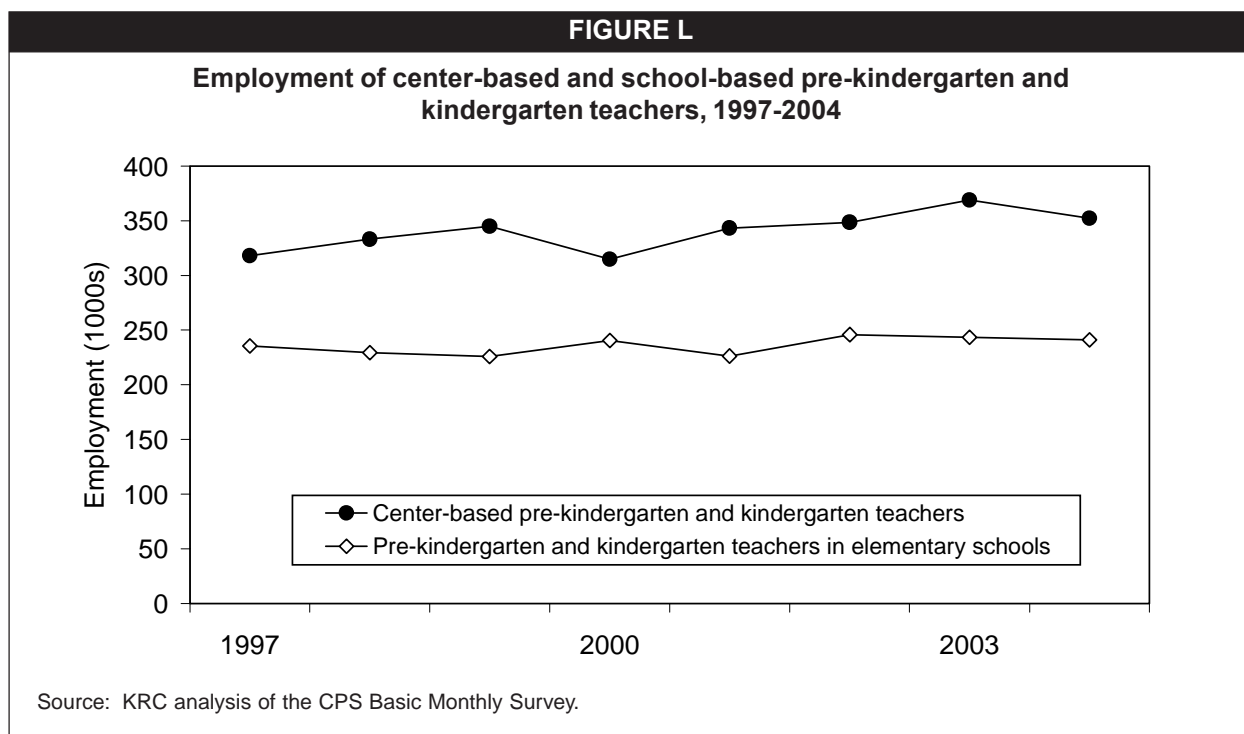
Source: KRC analysis of the CPS Basic Monthly Survey.

In 2000-04, rather than younger center-based teachers and administrators having higher education levels (as is the case for workers as a whole), they have much lower levels: just over 25% of teachers and administrators ages 24 to 36 have a college degree compared to 36% of those ages 40 to 50 and 43% of those age 50 and over.

Figure L suggests that it has been difficult to attract or retain college-educated workers into early childhood education since at least the early 1980s. (Indeed the figure suggests that the brain drain from ECE began in the 1970s. By 1983-87, teachers and administrators ages 34 to 43 are already better educated than teachers and administrators ages 24 to 33. If 10 years earlier, teachers and administrators ages 24 to 33 were as educated as the 34 to 43 group in 1983-87, and if the emerging field in the mid-1970s was dominated by young teachers, then the peak in educational attainment in ECE may have been the mid-1970s not 1982 and 1983. Unfortunately, the lack of a CPS center-based industry category prior to 1982 makes this impossible to confirm.)

Since the 1980s, educated women have had greater opportunities in more fields of work compared to earlier decades. In some cases, they have had greater economic need due to larger numbers of single-parent families and declining male wages.

In sum, for the past 20 years the early childhood industry has been living off the college-educated teachers and directors who entered the industry in the 1960s and 1970s and stayed with it. The commitment of these women to the field has helped cushion the industry from the full impact of its inability to attract adequate numbers of educated workers to keep pace with industry growth. But the 1983 age group of 22- to 46-year-olds has been moving up the age distribution and is now 43 to 67. In 1983, one out of every 10 college degree holders in center-based early education was age 47 or older. By 2004, a



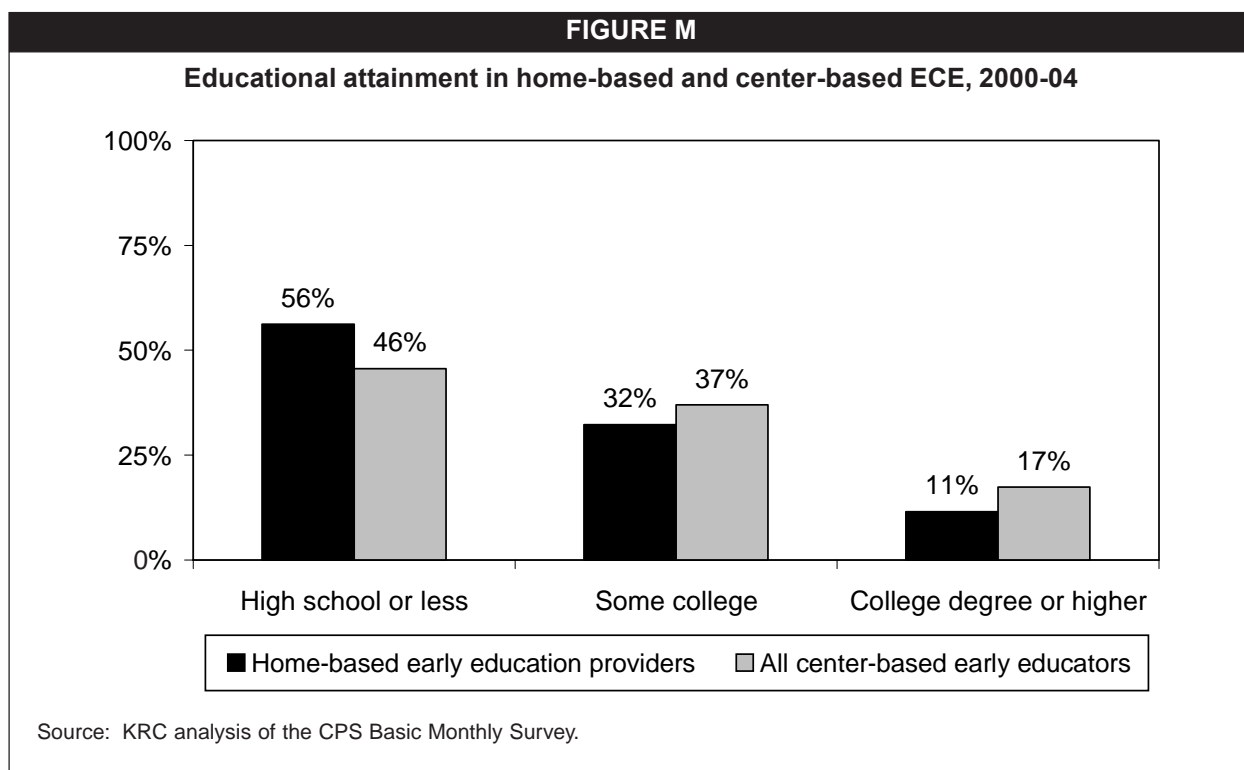
third of center-based college-degree holders were 47 or older—some 41,891 people. As these women retire over the next two decades, the effort to maintain a qualified ECE workforce will become even more difficult.

The impact of school-based preschool

Over the past several years, states such as Arkansas, Florida, Georgia, Massachusetts, New Jersey, New Mexico, New York, Oklahoma, and Wisconsin have taken initial steps towards universal preschool education, with some of this delivered in public schools. The data on center-based ECE, however, do not include school-based preschool. This raises questions about the extent of school-based preschool and whether including school-based preschool would change the conclusion that education among teachers and other educators in ECE has fallen.

The short answers are that school-based preschool still appears to be relatively small and that it has not expanded enough, at least in recent years, to make a big difference in overall ECE workforce education levels. Figure L provides one indication of this. The figure shows employment of kindergarten and pre-kindergarten teachers in centers and in schools since 1997. If school-based preschool were growing very quickly since that time, some growth would be expected in the lower of the two trend lines, but almost no growth has taken place.

Further corroboration that school-based preschool is relatively small comes from the recently published national pre-kindergarten study (Gilliam and Marchesseault 2005). Based on a comprehensive national survey, Gilliam and Marchesseault estimate that there were 40,211 classes within state-funded pre-kindergarten programs operating in the nation in 2003 and 2004, with 75% of these within schools. Assuming one teacher per class, this amounts to about 30,000 pre-kindergarten teachers in schools. This is only one-fourteenth of the 420,000 teachers and administrators in center-based care, too small to change the college-degree share of the center-based teachers and administrators sample by more than a few percentage points.¹⁷



Educational attainment in home-based ECE

Having focused to this point on centers, we now examine education levels in home-based ECE. Since a consistent series in home-based ECE does not exist over the full two-decade period (in part because of the addition in 1992 and elimination in 2000 of family day-care homes as an industry category), the data presented on home-based ECE are only for 2000 to 2004, the years since the 2000 change in occupation and industry codes. Since no clear trend exists in educational attainment within home-based ECE over this period, all five years are pooled.

Figure M shows that education levels in home-based ECE are much lower than center-based early childhood education. (Since the home-based sample includes all early childhood educators in home-based care, the sample is compared with all early childhood educators in center-based ECE rather than with just center-based teachers and administrators.)

- Only about one in nine home-based early childhood educators has a college degree compared to nearly one in six in center-based ECE.
- Well over half of home-based early childhood educators have a high school degree or less compared to well under half for center-based educators.
- Twenty-one percent of home-based early childhood educators have less than a high school degree compared to 12% of center-based staff (this difference is not shown in the figure).

All of these differences between the education levels of home-based and center-based ECE are significant at the 1% level.

Wages, Benefits, and Income Levels¹⁸

An examination of a range of economic variables—such as wages, benefits, and income levels—will shed light on why educational attainment has been falling in center-based ECE. As explained in the introduction, for variables other than educational attainment (which come from a smaller sample than the full CPS) three-year averages are used to improve the reliability of our estimates.¹⁹

Wages

Figure N and **Table 6** show the wages of center-based teachers and administrators and all center-based early childhood educators. The wages of all workers and of female college graduates are also displayed: the former indicate overall wage trends; the latter indicate the wage competition ECE faces in trying to retain college-educated teachers. Since over 95% of center-based teachers and administrators are women throughout the period, the wages of female college graduates are a good gauge of what ECE staff with college degrees might earn in other fields.

Figure N shows that center-based early childhood educators earned low wages throughout the 1983-2004 period. Even in 2004, teachers and administrators in center-based ECE earned only \$10 per hour compared to \$19.23 for all female college graduates. At the beginning of the period of analysis, the median wage for center-based teachers and administrators was 55% of the median wage of female college graduates. Two decades later it was only 52%.²⁰ Over the full period, the median wage of female college graduates increased \$4.09 versus only \$1.63 for center-based teachers and administrators. Over the course of a full-time work year (2,080 hours), the difference of \$2.46 per hour in the increase received by the two groups amounts to about \$5,000.

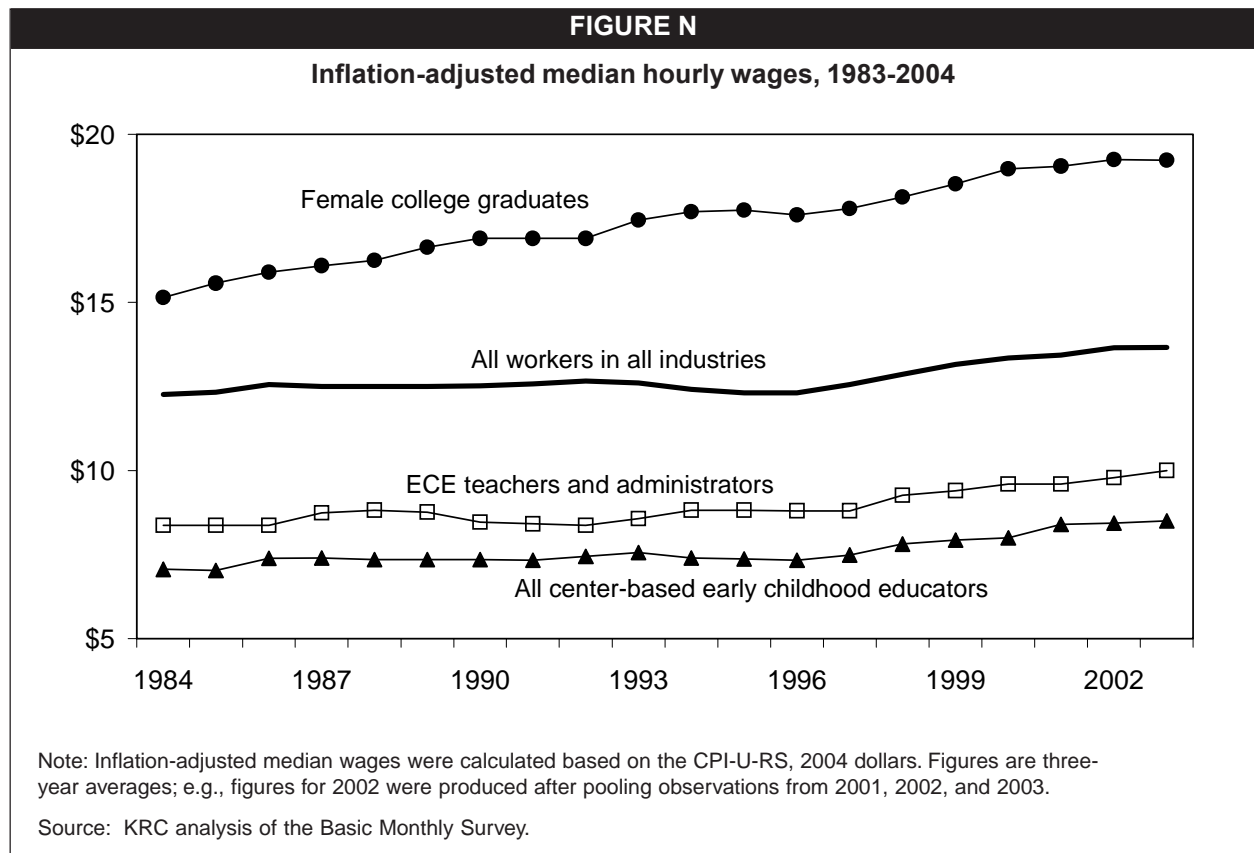


TABLE 6
Inflation-adjusted median hourly wages, 1984-2003

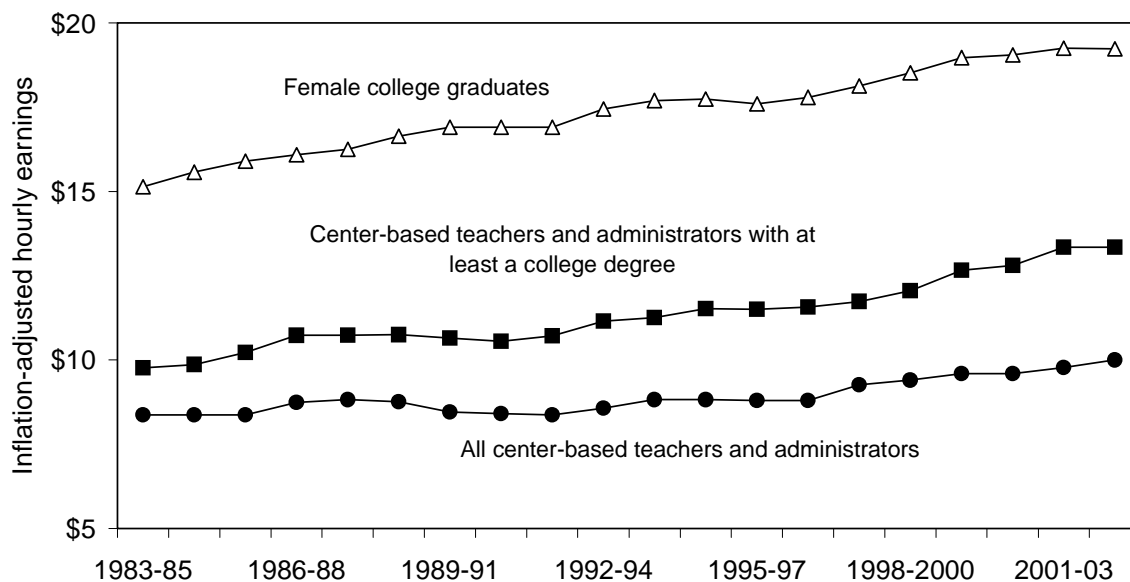
Year	Center-based teachers and administrators	Center-based teachers with a college degree or higher	All center-based educators	All workers, all industries	Female college graduates
1984	\$8.37	\$9.76	\$7.06	\$12.26	\$15.14
1985	8.37	9.86	7.03	12.33	15.57
1986	8.37	10.22	7.39	12.55	15.90
1987	8.74	10.73	7.40	12.50	16.09
1988	8.82	10.74	7.35	12.50	16.25
1989	8.76	10.75	7.35	12.50	16.64
1990	8.46	10.65	7.35	12.51	16.90
1991	8.41	10.55	7.33	12.57	16.90
1992	8.37	10.72	7.44	12.66	16.90
1993	8.57	11.15	7.56	12.60	17.45
1994	8.82	11.26	7.40	12.42	17.70
1995	8.82	11.52	7.37	12.31	17.74
1996	8.80	11.50	7.33	12.31	17.60
1997	8.80	11.57	7.49	12.55	17.79
1998	9.26	11.73	7.81	12.86	18.13
1999	9.40	12.05	7.93	13.16	18.52
2000	9.60	12.67	8.00	13.34	18.97
2001	9.60	12.80	8.40	13.43	19.05
2002	9.78	13.35	8.44	13.65	19.25
2003	10.00	13.35	8.50	13.66	19.23

Note: Inflation-adjusted median wages were calculated based on the CPI-U-RS, 2004 dollars. Figures are three-year averages; e.g., figures for 2002 were produced after pooling observations from 2001, 2002, and 2003.

Source: KRC analysis of the CPS Merged Outgoing Rotation Groups.

It is also instructive to look at wage changes for portions of the full 22-year period. From 1984 to 1992, the wages of center-based teachers and administrators did not rise at all; from 1984 to 1997, they rose only 43 cents per hour compared to an increase of \$2.63 per hour for all female college graduates. Recall from Table 2 that most of the fall in the education levels of center-based teachers and administrators took place during 1984 to 1997.

Figure O looks separately at the wages of center-based ECE teachers and administrators with a college degree and compares those with all female college graduates. The figure shows that ECE teachers and administrators with a college degree have typically earned only about two-thirds of similarly educated women in other fields. This percentage has gone from a low of 62% in the early 1990s to 69% in the most recent three-year period. Figure O indicates that wages for college-educated teachers and administrators have gone up in ECE since the mid-1990s as this resource-constrained industry has sought to stem the loss of more experienced and educated workers. But this increase has been too little too late, at best able to limit the further erosion of educational attainment. Looked at slightly differently, even to hold onto the existing number of college-educated center-based teachers and administrators now requires ECE to pay nearly 70% of the wages of female college graduates in all industries. (Attracting new college-educated center-based teachers might take higher wages.) But center-based teachers and

FIGURE O**Inflation-adjusted hourly earnings**

Note: Inflation-adjusted median wages were calculated based on the CPI-U-RS, 2004 dollars. Figures are three-year averages; e.g., figures for 2002 were produced after pooling observations from 2001, 2002, and 2003.

Source: KRC analysis of the CPS Merged Outgoing Rotation Groups.

administrators overall earn only 52% of what all female college graduates earn, far below the wage level necessary to bring the college degree share in the industry back up.

Industry observers believe that home-based providers earn lower net pay than center-based early childhood educators after business-related costs and long hours are taken into account. Since the CPS data extract did not include hourly earnings for self-employed workers, the 2000 Census was used to estimate home-based early childhood educator earnings. Based on the Census, this group earned \$7.64 per hour in 2000. While this could be an overestimate (because home-based survey respondents do not fully take into account their costs of doing business and hours of work), \$7.64 is slightly lower than the hourly wage of all early childhood educators.

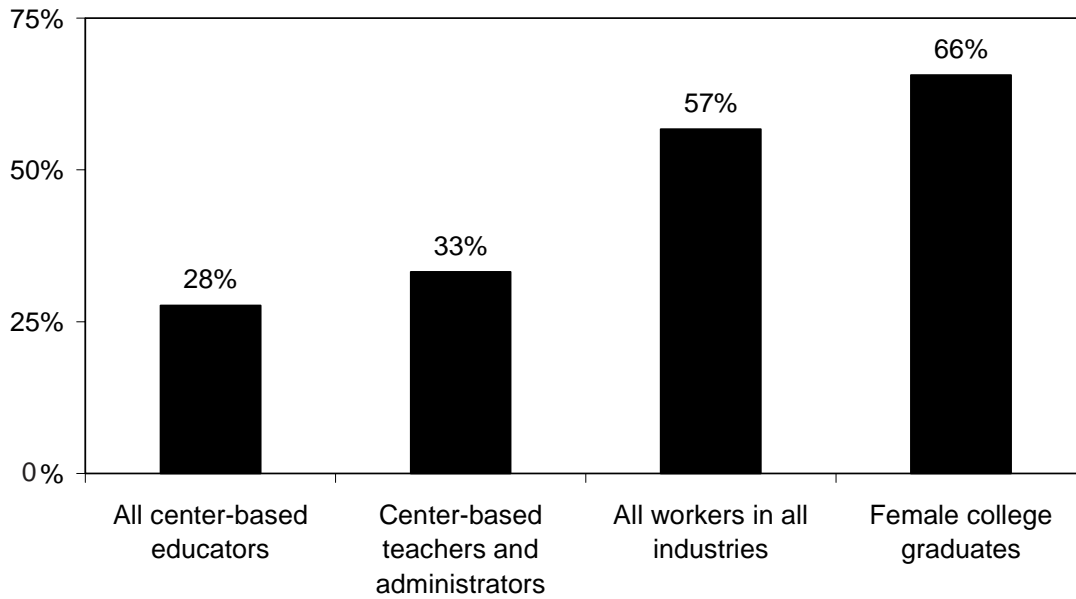
Health benefits

With respect to health and pension benefit levels, no clear trend exists from 1983 to 2004, therefore this study reports only these numbers for the most recent three-year period, 2002-04. **Figure P** and **Figure Q** show that early childhood educators are much less likely to have employer-provided health insurance than other workers and more likely to lack insurance altogether.

- While over half of all workers and two-thirds of female college graduates have employer-provided health insurance through their job, only a third of center-based teachers and administrators obtain health care through their ECE job (Figure Q). Just over a quarter of all center-based educators receive health care benefits through their job.

FIGURE P

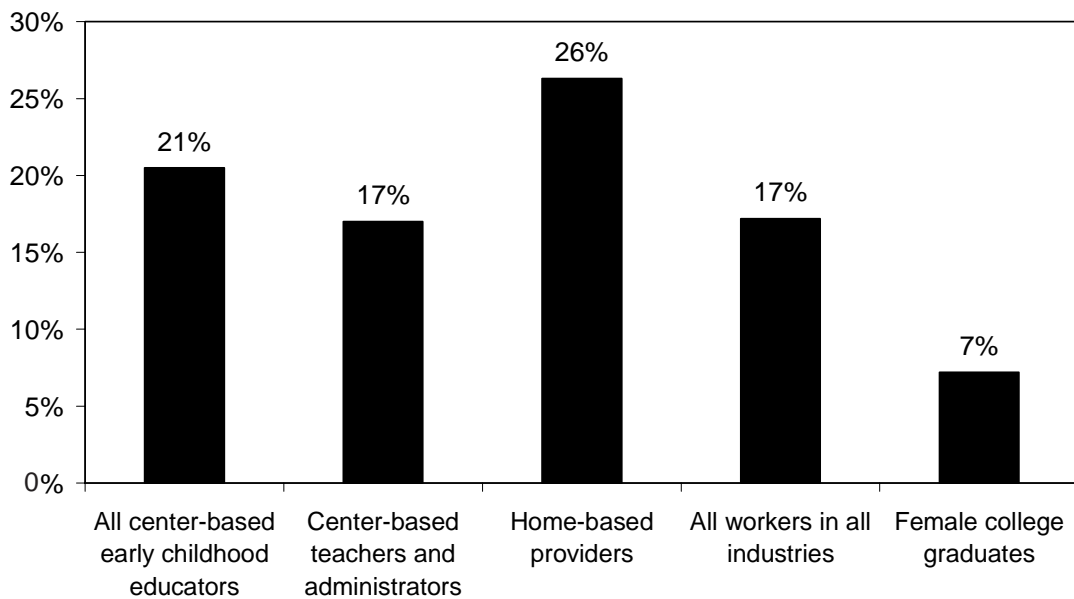
Percent of workers with employer-provided health insurance, 2002-04



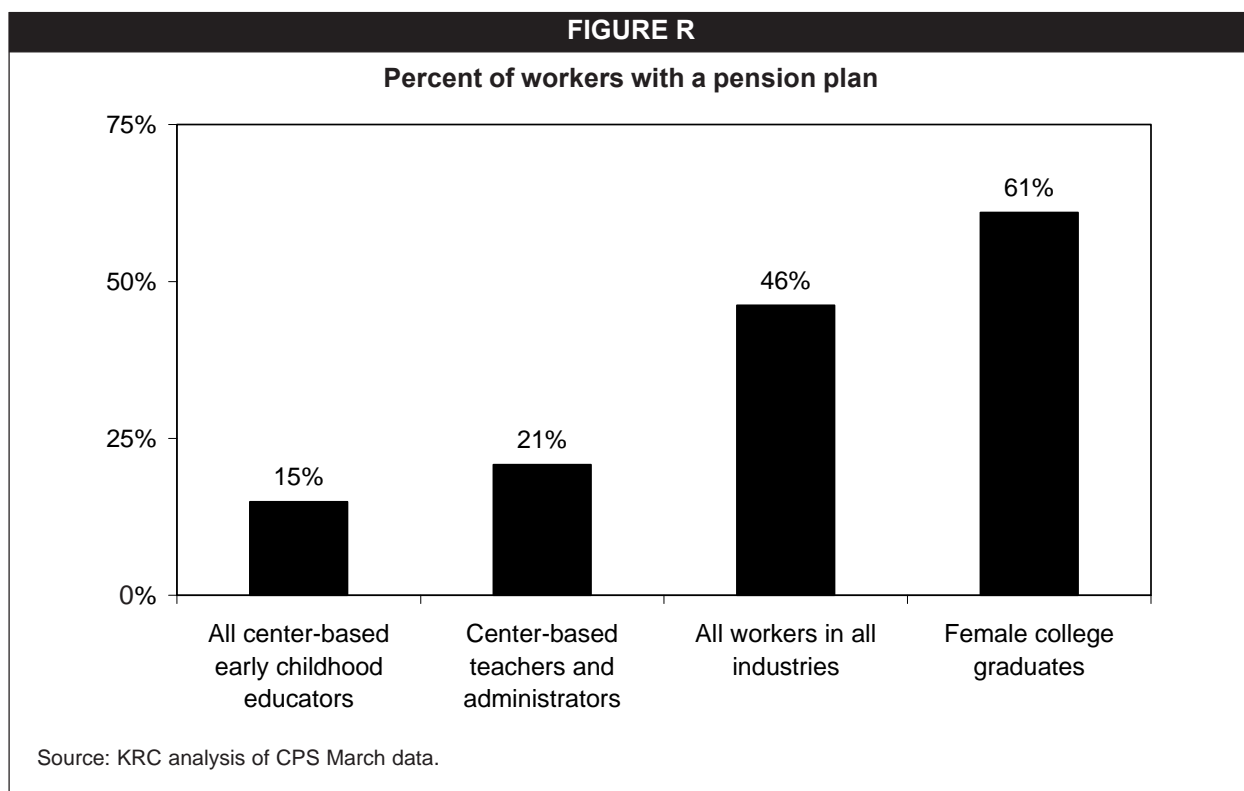
Source: KRC analysis of the CPS March data.

FIGURE Q

Percent of workers with no health insurance coverage, 2002-04



Source: KRC analysis of the CPS March data.



- About one in six center-based teachers and administrators, and one in five of all center-based educators have no insurance at all (Figure P). This compares with one in 16 for all female college graduates. Over a quarter of home-based early childhood educators have no health insurance coverage.

The differences in the shares of employer-provided health coverage between each of the three groups of ECE staff (center-based teachers and administrators, all center-based early childhood educators, and home-based educators) and each of the two other groups (all workers and female college graduates) are all significant at least the 5% level. The differences in the shares of ECE staff and other groups with no health insurance are also significant at this level.

Pension coverage

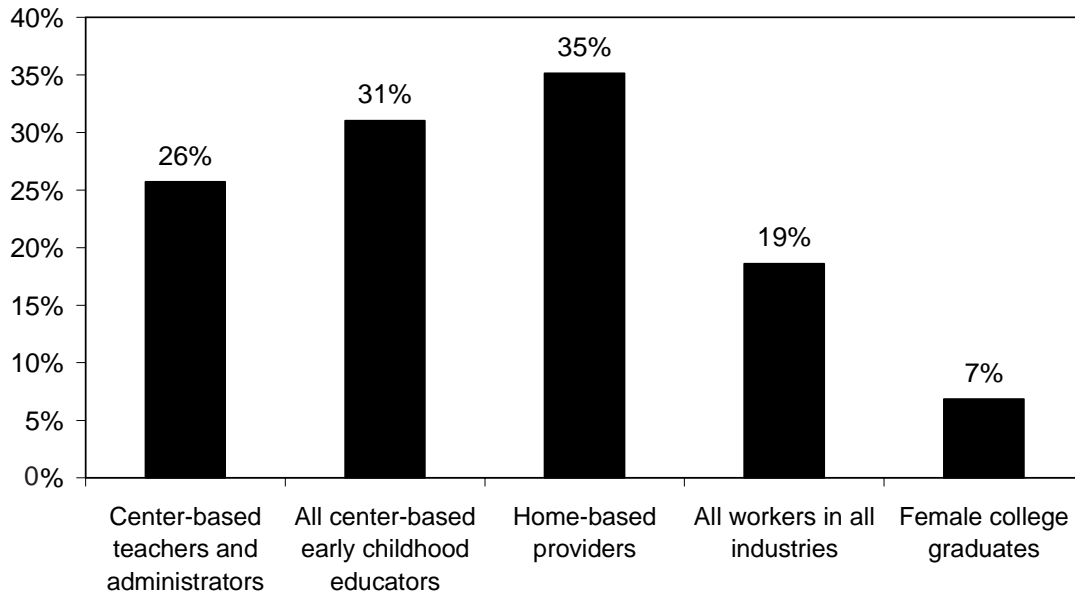
One in five teachers and administrators in center-based ECE participate in employer sponsored pensions compared to 61% of women with a college degree (**Figure R**). Slightly less than one in six of all early childhood educators participate in an employer sponsored pension plan compared to 46% of all workers. As with health coverage, differences in pension coverage between ECE groups and the comparison groups are significant at the 5% level.

Income levels

Income levels provide another indication of the economic status of ECE workers. **Figure S** shows the share of center-based ECE staff with incomes below 200% of the poverty line and the same share for all workers and female college graduates. The last two categories again provide points of comparison to the

FIGURE S

Share of workers below 200% of the poverty line, 2002-04



Source: KRC analysis of CPS March data.

overall labor market and to the college-educated group that ECE has struggled to attract and retain. Two hundred percent of the poverty line is generally regarded as a rough approximation of a minimally adequate income, high enough for a family to cover the costs of basic necessities without public assistance.

Figure S also shows that over a quarter of center-based teachers and administrators have incomes below 200% of the poverty line. This is above the level for all workers and nearly four times the level for female college graduates. The share of all center-based and all home-based early childhood educators below 200% of a poverty income is higher still—about one-third.

Conclusion

The most educated age cohort in the ECE industry today is in its late 50s. As these workers retire, the difficulty of achieving a qualified ECE workforce will grow more severe. To garner the long-term benefits documented from high-quality preschool programs, the United States needs to raise both the qualifications of early childhood educators and the compensation needed to keep educated professionals in the field.

A pragmatic and systemic approach should not only mandate higher qualifications, but also provide for reasonable phase-in periods coupled with scientific research that deepens our understanding of the long-term benefits of different approaches to staff development. Critical research questions include better determining the value of different levels of formal education (e.g., generic BAs, BAs in early childhood education, AAs in early children education) and of more formal education in conjunction with mentoring for new teachers plus expanded work-based peer learning. (It is widely observed that K-12 teacher preparation and professional development is not connected enough with the daily practice of teaching; as education and training investments expand in ECE, the same mistake should not be repeated.)

One particular model to explore is “differentiated staffing,” which combines a lead teacher who has a BA in ECE with assistant teachers who have lower-level credentials. This mix might make it possible to attract some exceptional new teachers to the field as well as enable incumbent workers to meet higher standards by upgrading their skills and education levels.

With new federal and state policies, the present reality, in which many ECE staff have low education levels, no meaningful training in early childhood development, and no opportunities to learn from experienced and qualified peers, will persist. It is well past time to recognize that “society can’t afford not to pay” more for ECE teachers, and that the community as a whole can collect the long-term benefits of high-quality early childhood education.

Technical Appendix

The analysis in this study uses data sets constructed from the Current Population Survey (CPS), a monthly survey of 60,000 U.S. households. (In seven companion state-level Issue Briefs and in rankings of ECE workforce characteristics in a much larger group of states, the decennial Census from 1990 and 2000 were used.) The report relies on three different CPS extracts to produce numbers on educational attainment, wages, and on benefits and income levels.

For educational attainment, the full basic monthly CPS was used, which includes a battery of questions about respondents' education level, demographic characteristics, and employment status and job, including occupation and industry. In analyzing educational attainment in ECE, the 12 monthly CPS samples for each year were used. In this pooled sample, the number of observations for teachers and administrators in center-based ECE ranges from 1,389 in 1983 to 1,897 or higher in every year since 1990.

Wage data is only available from one third of the basic CPS sample (the so-called Outgoing Rotation Groups²¹). Therefore, to increase sample size, data were pooled for three years in analyzing wage trends.

Only the March supplement to the CPS provides information on income, health, and pension coverage.²² Thus the data on these variables comes from a sample one twelfth the size of the full CPS. As with wages, this monograph pools three years of data for these variables. Only the most recent three years of data for health and pension benefits are reported. (This is done largely because there is no obvious time trend in the benefits data. It is also true that sample sizes for ECE are larger at the end of the period than the beginning because of the growth of ECE).

Constructing consistent data from the CPS over time

The major obstacle to the creation of consistent time series for more than a decade from the CPS results from modifications made each decade to industry and occupation classifications or "codes." The CPS incorporated new industry and occupation codes in 1983, 1992, and 2000.²³

In early childhood as a whole, one industry and two occupation categories are available from the 1983 to 2004 CPS:

- the child day-care services industry (since this industry category was not available prior to 1983, a center-based industry cannot be constructed prior to that time);
- the kindergarten and pre-kindergarten teacher occupation (this occupation is available prior to 1983 and is used selectively to explore developments in ECE from 1979 to 1982); and
- the administrator occupation.

The following industry and occupation categories are available for only part of the 1983 to 2004 period from the CPS:

- The family child-care home industry is available only from the 1992-99 CPS.
- The early childhood teacher assistant occupation is introduced in the 1992 CPS. This category is eliminated in 2000 although a generic teacher assistant category remains (so that it is still possible to extract teacher assistants in child day-care services).
- The family child-care provider occupation category is available only from the 1992-99 CPS.
- Child-care workers, private households and child-care workers, not elsewhere classified are available from the 1983-99 CPS.
- Beginning in 2000, the two child-care worker occupations (child-care worker, private household and child-care worker, not elsewhere classified) were consolidated into a single code.

Table A-1 shows how this study constructed a center-based industry over time from the available industry and occupation codes. Within the center-based industry, it defines and reports data for two different groups of workers.

TABLE A-1
**CPS industry and occupation codes in center-based
early childhood education, 1983 to 2004**

<i>Years</i>	<i>Industry code</i>	<i>Industry title</i>
1983-99	862	Child day-care services
2000-03	8470	Child day-care services
<i>Years</i>	<i>Occupation code</i>	<i>Occupation title</i>
1983-99	14	Administrators
2000-03	230	
1983-99	155	Teachers, pre-kindergarten and kindergarten
2000-03	2300	
1992-99	467	Early childhood teacher's assistants
2000-03	2540	Teacher's assistants
1983-99	468	Child-care workers, not elsewhere classified
2000-03	4600	Child-care workers

Source: Keystone Resource Center based on analysis of CPS codes.

1. *Teachers and administrators in center-based early education.* This group includes teachers and administrators in child day-care services, both of which are available for the full two-decade period. We exclude “self-employed” teachers and administrators. Teachers and administrators in this group span those from public, private not-for-profit, and private for-profit firms.
2. *All early childhood educators in center-based early education.* This group includes teachers and administrators as well as teachers assistants and the generic residual occupation code (or codes) “child-care workers.” The report excludes all self-employed workers.

This study also experimented with a data series constructed for home-based ECE for the 1983 to 2004 period (**Table A-2**). This data series included all self-employed early childhood education occupations in all industries.²⁴ For those years for which it is available it also included all occupations in the family child care homes industry. Finally it included all early childhood education occupations in the “private household” industry (some but not all of these are self-employed). Because of questions about its consistency over time, we report this home-based series in the text only since the most recent break in the data series (i.e., from 2000 forward). (However, a separate Appendix available on the Keystone Research Center Web site contains the full series on home-based education.)

A data series was also constructed that identifies, as well as is possible, school-based early childhood education (**Table A-3**). This series is available in some form from 1979 through 2004 and includes pre-kindergarten and kindergarten teachers and child-care workers employed in elementary schools. It is unknown what share of teachers in school-based ECE are kindergarten teachers and what share are pre-kindergarten teachers.

The impact of changes in CPS industry and occupation codes

To explore the consistency of our constructed data series over time, this report examines whether key variables have discontinuities when CPS industry and occupation codes change in 1992 and 2002. The tables and text of this report reveal that education and wage trends in center-based ECE teachers and administrators do not change much in 1992 and 2000, the years when new codes were introduced. For center-based teachers and administrators

TABLE A-2
CPS industry and occupation code combinations
in home-based early childhood education, by year

<i>Years</i>	<i>Industry code</i>	<i>Industry title</i>	<i>Occupations and titles</i>
1992-99	863	Family child-care homes	All occupations (in practice, almost entirely 466, family child-care providers and 467 early childhood teacher's assistants)
1983-99	761	Private households	406, child-care workers, private households
2000-04	9290	Private households	4600, child-care workers
1983-99	862	Child day-care services	All self-employed workers in the CPS occupations listed in the lower half of Table A-1
2000-04	8470	Child day-care services	All self-employed workers in the CPS occupations listed in the lower half of Table A-1
1983-04	All	All	1983-99, self-employed workers in 468, child-care workers, not elsewhere classified 2000-04, self-employed workers in 4600, child-care workers

Source: Keystone Resource Center based on analysis of CPS codes.

TABLE A-3
CPS industry and occupation code combinations in school-based
early childhood education, by year

<i>Years</i>	<i>Industry code</i>	<i>Industry title</i>
1979-82	857	Elementary schools
1983-99	842	
2000-03	2300	
<i>Years</i>	<i>Occupation code</i>	<i>Occupation title</i>
1979-82	143	Teachers, pre-kindergarten and kindergarten
1983-99	155	
2000-03	2300	
1979-82	942	Child-care workers, except private household Child-care workers, not elsewhere classified Child-care workers
1983-99	468	
2000-03	4600	

Source: Keystone Resource Center based on analysis of CPS codes.

TABLE A-4
Employment in center-based early childhood education

Early childhood occupations in child day-care services (and hence center-based care as defined here)

Year	Teacher's assistants		Child-care workers		Administrators	Teachers, pre-kindergarten & kindergarten	Teachers plus administrators		All early childhood educators
	Employment	Share of total	Employment	Share of total	Employment	Employment	Employment	Share of total	Employment
1983			120,880	41%	35,025	141,319	176,344	59%	297,224
1984			137,886	43	34,064	152,105	186,169	57	324,055
1985			140,656	41	36,141	162,195	198,337	59	338,992
1986			148,013	39	37,348	190,202	227,550	61	375,563
1987			163,753	41	44,701	194,069	238,770	59	402,523
1988			177,471	40	60,530	203,774	264,304	60	441,775
1989			200,294	43	53,601	216,494	270,096	57	470,389
1990			202,981	41	50,266	241,442	291,708	59	494,689
1991			222,410	43	49,405	241,260	290,664	57	513,074
1992	331,376	49%	26,525	4	54,678	260,355	315,033	47	672,934
1993	371,766	51	10,985	2	61,621	282,984	344,605	47	727,356
1994	367,778	51	8,368	1	71,525	269,012	340,537	48	716,683
1995	332,535	50	4,267	1	59,745	275,230	334,975	50	671,778
1996	323,010	47	9,306	1	58,428	301,730	360,158	52	692,474
1997	336,035	46	3,262	0	68,857	317,981	386,838	53	726,135
1998	364,245	46	4,058	1	82,561	333,219	415,780	53	784,083
1999	426,518	49	6,764	1	84,012	344,888	428,900	50	862,182
2000	86,585	9	440,499	48	74,533	314,892	389,425	42	916,510
2001	100,414	10	465,729	47	71,728	343,263	414,991	42	981,134
2002	97,642	10	483,447	49	64,966	348,673	413,639	42	994,727
2003	105,331	11	372,099	40	82,774	369,000	451,774	49	929,204
2004	63,062	7	430,662	47	74,325	352,447	426,772	46	920,495

Source: KRC analysis of the CPS Basic Monthly Survey.

only two of the 17 percentage-point decline in the college degree share takes place in 1992 and 2000 (Table 2). On net, none of the nine percentage-point rise in the high-school-and-less share among center-based teachers and administrators takes place in 1992 and 2000. (This share rises two percentage points in 1992 and falls two percentage points in 2000.) For all early childhood educators, the change in code years plays a larger role in education trends: four of the 12 percentage-point fall in college degree share takes place in 1992 and 2000; and the high-school-and-less share rises six percentage points in 1992 and 2000, whereas it only rises over the 22-year period as a whole by four percentage points (i.e., it falls by two percentage points if you leave out 1992 and 2002.)

To further explore the consistency of the constructed series over time, this report examines employment changes when industry and occupation codes change. We begin by considering employment of teachers and administrators in center-based ECE. Recall that in 1992, a new occupation (teacher assistant) was introduced. One fear is that this might lead to an artificial reduction in the number of teachers and administrators because some assistants might have been coded as teachers when the choice of calling them assistants did not exist. This, however, does not appear to have happened: the number of teachers reported increases 20% in 1992 (and the number of administrators by 6%). In 2000, with the removal of a teacher assistant occupation specific to early childhood education, a concern might be that the number of teachers would increase artificially rapidly (because now some assistants would be coded as teachers). In fact, the number of teachers reported declines by 16%. Based on these employment data and the continuity of education and wage trends, this study considers the teachers plus administrators category to include a comparable group of people across the entire CPS data set.

Next to consider is the continuity of our occupational aggregate: all early childhood educators in center-based ECE. In contrast to teachers and administrators alone, the aggregate of all center-based ECE occupations in the right-hand column of **Table A-4** increases a lot in 1992, by 32%. It appears that the new teacher assistant

TABLE A-5
Employment in home-based early education

Year	Child day-care services, self-employed		Family child-care homes (all workers in industry=863)		Child-care workers, private household		Self-employed child- care workers in other industries		Total
	Employ- ment	Share of total	Employ- ment	Share of total	Employ- ment	Share of total	Employ- ment	Share of total	
1983	57,929	8%			417,439	54	293,512	38%	768,881
1984	72,504	9			397,052	51	310,874	40	780,430
1985	74,993	9			395,781	49	344,796	42	815,571
1986	81,281	10			396,314	48	347,989	42	825,584
1987	101,423	12			396,731	46	360,200	42	858,354
1988	107,980	13			371,922	44	357,766	43	837,668
1989	117,326	15			346,423	43	338,195	42	801,944
1990	142,945	18			311,794	38	359,053	44	813,792
1991	170,145	19			329,332	38	376,507	43	875,984
1992	59,438	7	319,517	40%	356,068	44	68,643	9	803,666
1993	56,422	7	303,986	40	348,587	45	57,179	7	766,173
1994	72,462	9	415,688	52	283,258	36	20,896	3	792,304
1995	54,551	6	484,394	57	308,852	36	7,773	1	855,570
1996	44,154	5	486,596	60	268,917	33	7,430	1	807,096
1997	36,555	5	510,863	63	255,370	31	8,863	1	811,652
1998	44,275	5	482,747	60	272,379	34	8,533	1	807,934
1999	49,334	6	466,641	58	285,136	35	8,552	1	809,663
2000	468,297	72			177,832	27	8,010	1	654,140
2001	449,666	71			174,855	28	8,108	1	632,630
2002	441,160	72			168,810	27	6,062	1	616,033
2003	463,280	70			196,059	29	6,584	1	665,922
2004	488,076	66			237,212	32	10,422	1	735,710

Source: KRC analysis of the CPS Basic Monthly Survey.

category not only absorbs most of the child-care worker category (which drops 191,271) but a large number of other workers as well. This broadening of the category may help explain why 1992, a year of slow economic growth, nonetheless contributes three percentage points to the decline in the college-degree share of all center-based early childhood educators and three points to the rise in the share with no more than a high-school degree (Table 3). In 2000, the second break year for the CPS, there is no discontinuity in employment of early childhood educators, which increases from 862,182 to 916,510. Since there is possible inconsistency between the 1992 and 1991 figures for all center-based early childhood educators, the study relies most in the text on the figures for center-based teachers and administrators.

Third to consider is employment trends for the constructed home-based ECE industry (**Table A-5**). Despite the addition of a family child care home category in 1992, the home-based industry shrinks by 9%. It shrinks even more in 2000—by 19%—when the family child-care home industry is eliminated. In the latter case, one check on the plausibility of the 19% drop is the number of children served under the federal Child Care Development Fund (CCDF) in home-based settings in 1999 and 2000. This series shows that 776,000 children were served in home-based care in 1999 and 734,000 in 2000, a drop of 5%.²⁵ While not definitive, this discrepancy in home-based employment fluctuations suggests that much of the decline in home-based care in the CPS in 2000 was the result of the elimination of the Family Day Care Homes industry category.

Two other concerns exist with the home-based data series over time. First, ECE industry experts who reviewed a draft of this report believe that the CPS misses a substantial fraction of “underground” home-based care (and that the Census does also). They also suspect that this underground industry may have grown over time, including with the implementation of welfare reform in the mid-1990s and the growth of the undocumented immigrant population. Second, the Census estimate of wages in home-based care rises from \$4.61 in 1980 to \$5.85 in 1990 to \$7.64 in 2000. Industry experts do not believe that hourly compensation has increased this much

TABLE A-6
All early childhood education employment (including kindergarten teachers)

	All center-based educators		All home-based educators		Early education staff in other industries		All school-based early childhood educators*		Total
	Employment	Share of total	Employment	Share of total	Employment	Share of total	Employment	Share of total	
1983	297,224	21%	768,881	55%	116,046	8%	204,051	15%	1,386,201
1984	324,055	23	780,430	55	116,996	8	203,884	14	1,425,364
1985	338,992	23	815,571	55	121,393	8	200,429	14	1,476,386
1986	375,563	24	825,584	54	120,719	8	216,979	14	1,538,845
1987	402,523	25	858,354	52	138,692	8	242,034	15	1,641,604
1988	441,775	26	837,668	50	135,179	8	258,639	15	1,673,260
1989	470,389	28	801,944	47	134,679	8	286,226	17	1,693,238
1990	494,689	29	813,792	47	141,860	8	268,307	16	1,718,648
1991	513,074	28	875,984	49	149,980	8	263,728	15	1,802,766
1992	672,934	35	803,666	42	142,448	7	282,729	15	1,901,777
1993	727,356	38	766,173	40	136,400	7	302,187	16	1,932,116
1994	716,683	36	792,304	40	143,900	7	313,577	16	1,966,465
1995	671,778	34	855,570	43	148,518	7	326,231	16	2,002,096
1996	692,474	35	807,096	41	150,838	8	307,145	16	1,957,552
1997	726,135	35	811,652	39	159,094	8	365,580	18	2,062,461
1998	784,083	37	807,934	38	165,085	8	357,685	17	2,114,787
1999	862,182	39	809,663	37	157,793	7	357,081	16	2,186,720
2000	916,510	43	654,140	31	220,005	10	339,734	16	2,130,388
2001	981,134	46	632,630	30	189,662	9	315,761	15	2,119,187
2002	994,727	46	616,033	28	203,983	9	350,828	16	2,165,570
2003	929,204	44	665,922	32	156,112	7	343,807	16	2,095,045
2004	920,495	43	735,710	34	153,172	7	353,680	16	2,163,057

* Pre-kindergarten and kindergarten teachers plus child-care workers.

Source: KRC analysis of the CPS.

over time. If this is correct, then it further suggests that a small, higher wage/more educated fraction of home-based may be captured toward the end of the 22-year constructed home-based series.

Out of concern about the inconsistency of the data over time, we report home-based data only for the period since 2000 during which a consistent series of industry and occupation codes have been applied to the data. Questions still exist regarding whether this data fails to capture the least-educated and lowest-wage part of home-based ECE.

Total employment in U.S. early childhood education

Outside the center-based and home-based ECE series, ECE occupations exist in elementary schools and in industries other than child day care services, family child care homes, private households, and elementary schools. Adding in school-based ECE and ECE in other industries, **Table A-6** summarizes employment across all of ECE.

The last column of Table A-6 shows that the aggregate of ECE occupations in all industries grew steadily from 1983-99 before plateauing in the past four years.

Statistical significance

In determining whether differences—between different groups or within a group over time—were statistically significant this study followed procedures recommended by the Bureau of Labor Statistics (U.S. Department of Labor 2005). In the BLS formula for calculating standard errors, the “a” and “b” parameters specified in Table 1-D in the BLS report for educational attainment were applied. When comparing results within and across groups from the CPS basic monthly survey, we inflated standard errors by the “f” factor for yearly averages. For tests of differences using CPS March data, a supplement to the basic monthly survey which is conducted every year in a single month an “f” factor of 1 was applied to estimates derived after pooling three years of data.

Endnotes

1. Women make up over 95% of center-based early childhood educators during the period examined. This makes the wages of female college graduates a logical point of reference when considering ECE's difficulty attracting and retaining educated teachers.
2. For one analysis that acknowledges the ample evidence that children's early language and cognitive growth advance more quickly when taught by better-educated adults, but argues that the value of a BA, per se, remains undemonstrated, see Fuller, Livas, and Bridges 2005.
3. For those interested in comparing it with CPS data, an Appendix to this report on the Keystone Research Center Web site (www.keystoneresearch.org) contains national Census data.
4. To create a more consistent series, we remove the self-employed from child day-care services and place them in home-based ECE; for further discussion see the Technical Appendix.
5. The residual occupations may be recorded as part of a different industry because they operate within an organization the primary purpose of which is not to deliver ECE (e.g., a religious organization, residential care facilities, or private corporation with on-site child care center).
6. By restricting our analysis to occupations with primary responsibility for children, this report avoids clouding the data with information on food service workers, maintenance workers, janitors, etc.
7. Marcy Whitebook, personal communication.
8. The CPS educational question is online at the U.S. Census Bureau Web site, <http://www.census.gov/population/www/cps/cpsdef.html>.
9. See "Educational Attainment" at <http://www.census.gov/population/www/cps/cpsdef.html>.
10. This is the same adjustment as explained and defended in Jaeger 1997.
11. The difference between the share with a college degree or higher in 1983 and 2004 is significant at the 1% level. The difference between the share with a high school diploma or less is significant at the 5% level.
12. In percentage terms, the share of all center-based early childhood educators with a college degree or higher fell by 39%, similar to the 37% drop in the share of center-based teachers with at least a college-degree.
13. Both differences are significant at the 1% level.
14. The difference between the share of center-based teachers and administrators with at least a college degree and all workers with a college degree is significant at the 10% level for all years between 1983 and 1998.
15. Marcy Whitebook and Laura Sakai in a study of day-care centers in the San Francisco Bay area in 1994, 1996, and 2000 found that workers hired to fill vacancies had a lower level of education and less child-care specific training than the workers they were replacing (Whitebook and Sakai 2004).
16. The same demographic story can be found by comparing the 1980 and 2000 Census. Details available from the Keystone Research Center, www.keystoneresearch.org.
17. Gilliam and Marchesseault report that 80% of pre-kindergarten teachers in schools have a college degree. Adding 30,000 teachers, 80% of which have a college degree, to our center-based teachers and administrators sample in 2004 would increase the college degree share only by 3.4 percentage points. Moreover, some school-based preschool programs existed in 1983, at the start of this report's time series, so this 3.4 percentage points is an upper bound on how much adding school-based pre-kindergarten would reduce the decline over time in ECE teacher education levels.
18. All hourly wages discussed in this report are expressed in 2004 dollars. Nominal wages were deflated using the U.S. city average. All items, Consumer Price Index Research Series (CPI-U-RS), <http://www.bls.gov/cpi/cpiurstx.htm>.
19. Averages based on a single year were used in the analysis of educational attainment among early education occupations in the CPS to allow the reader to identify the role of changes in 1992 and again in 2002 in industry and occupation codes in the trends in educational attainment of early education providers.
20. This decline in the wages of ECE teachers and administrators relative to all female college graduates is significant at the 5% level.

21. Economic Policy Institute. CPS Org Labor Extracts, 1979-2003 (machine-readable data file). U.S. Department of Commerce. Bureau of the Census, principal investigator. Economic Policy Institute, distributor.
22. Current population survey utilities: annual demographic and income March files, 1962-2003 (machine-readable data file). U.S. Department of Commerce. Bureau of the Census, principal investigator. Unicon Research Corporation, distributor.
23. The official implementation of changes in industry and occupation codes based on changes in the 2000 Census was with the release of CPS data in 2003. With that release, the BLS also made it possible to apply the new industry and occupation codes to CPS data released between 2000 and 2002. This study used the new 2003 codes to define early childhood education workforce starting in 2000.
24. This was done because the majority of workers in the industry category Family Child Care Homes from 1992 to 1999 were self-employed, and the number of self-employed child-care workers in Child Day Care Services dropped significantly after the Family Child Care Homes industry was introduced. Even when Family Child Care Homes existed as a separate industry there were a small number of self-employed child care occupations still classified in Child Day Care Services and an even smaller number in other industries. To be consistent, all self-employed child-care occupations in all years were distributed into home-based care.
25. Authors' calculations based on data online at <http://www.acf.hhs.gov/programs/ccb/research/index.htm>. The same method as used in the text to check CPS employment shifts in 2000 against CCDF growth in center-based slots shows a 3% increase in children in CCDF center-based slots and a 6% increase in employment of center-based early childhood educators.

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