Who Leaves? How Job and Teacher Characteristics Relate to Turnover in Child Care Settings

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Early childhood care and education (ECCE) settings rely on teachers to support children's development and families' workforce participation. Yet ECCE teachers turn over at high rates, often twice as often as teachers in K-12 settings. Because large-scale ECCE workforce data are rare, little is known about how job and teacher characteristics relate to turnover. Using data on a large sample (N = 14,373) of teachers employed at publicly funded child care centers in Virginia in fall 2023, this study investigates associations between job and teacher characteristics and teacher turnover. Overall, 38% of teachers left their fall 2023 site by fall 2024. Wage, being a lead teacher, experience, education, and race/ethnicity were all related to turnover after accounting for region. Results from within-site models were similar. The findings from this study inform policies to increase ECCE teacher retention and point to key areas for future research.

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Abstract

Early childhood care and education (ECCE) settings rely on teachers to support children's development and families' workforce participation. Yet ECCE teachers turn over at high rates, often twice as often as teachers in K-12 settings. Because large-scale ECCE workforce data are rare, little is known about how job and teacher characteristics relate to turnover. Using data on a large sample (N = 14,373) of teachers employed at publicly funded child care centers in Virginia in fall 2023, this study investigates associations between job and teacher characteristics and teacher turnover. Overall, 38% of teachers left their fall 2023 site by fall 2024. Wage, being a lead teacher, experience, education, and race/ethnicity were all related to turnover after accounting for region. Results from within-site models were similar. The findings from this study inform policies to increase ECCE teacher retention and point to key areas for future research.

Key words: Child care, teacher turnover, teacher workforce

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Early childhood care and education (ECCE) settings can provide young children with foundational experiences that shape their learning trajectories and enable parents to participate in the labor market. To achieve these benefits, ECCE settings rely on stable, well trained teachers (IOM & NRC, 2015). Yet, teacher turnover rates in ECCE settings are quite high—often twice that of their K-12 counterparts (Bassok, Hall, Markowitz, et al., 2021; Bassok, Markowitz, Bellows, et al., 2021; Bellows et al., 2022; Denker et al., 2024). Turnover rates are particularly high in the child care sector, which is comprised of small, private businesses, and provides care to the largest number of children under five. Many child care centers lose more than half of their teachers year after year (Doromal et al., 2022).

Teacher turnover has negative implications for young children's development, as children benefit from consistent interactions with known caregivers (Hamre, 2014; Thompson, 2016; Choi et al., 2019; Markowitz, 2024; Tran & Winsler, 2011). The negative impact on children also occurs through lost investments in teacher development, and administrative time spent in hiring and administrative tasks rather than supporting instruction (Sorensen & Ladd, 2020). High rates of teacher turnover are also likely to impact parents' ability to work due to classroom or site closures, lost days of care due to difficulty maintaining staff-to-child ratios, the potential for reduced site operating hours, and general site instability (Bassok, Markowitz, Miller-Bains, et al., 2021; Hall, Fares, et al., 2023; Whitebook & Sakai, 2003).

While recent research has documented the prevalence of turnover, fewer studies have used large-scale data to describe which teachers leave. We know relatively little about how key job characteristics like pay, role, and age of children taught, as well as key teacher characteristics like experience, education, and race relate to turnover in child care settings. For instance, do assistant teachers leave at significantly higher rates than lead teachers? Are teachers with more formal education more or less likely to leave their jobs than those with less formal education? In large part, our lack of evidence on these question stems from a dearth of large-scale ECCE workforce data (Whitebook et al., 2018), particularly in the child care

sector. Teacher level data on child care teachers is rare but critical for informing strategic policies and practices aimed at reducing teacher turnover.

This study uses a unique, large-scale dataset from Virginia to provide statewide estimates of the relationship between a set of job and teacher characteristics and teacher turnover in child care settings. In doing so, it advances our understanding of who turns over and how this relates to their job and personal characteristics. Findings can inform not only practical efforts to reduce turnover, but also future research aimed at identifying causal links between policy solutions and turnover.

Turnover in ECCE Settings

Teacher turnover has been regarded as a problem in ECCE for many years (Markowitz & Bassok, 2024; Totenhagen et al., 2016; Whitebook et al., 1998; Whitebook & Sakai, 2003). More recently, improvements in statewide data systems have led to improvements in our understanding. Data from Louisiana suggests that center-based child care turnover rates are as high as 46% a year (Bassok, Markowitz, Bellows, et al., 2021), and that, over a three-year period, as many of 61% of the original set of teachers working at a child care site depart (Bellows et al., 2022). Data from Virginia, the setting of the present study, suggests annual center-based child care teacher turnover rates range from 36% to 38% (Denker et al., 2024; Fares et al., 2024).

While teacher turnover rates are, on average, high, they vary considerably across sites, with some sites experiencing barely any turnover at all and others experiencing persistently high turnover. Data from the 2019 National Study of Early Care and Education (NSECE) suggests about a third of centers face high turnover, defined as sites that lose more than 20% of their staff in a given year (Amadon et al., 2023); in Louisiana, about a third of child care centers lost at least half of their teachers in a year (Doromal et al., 2022). This variation across sites suggests that although turnover may be a systemic problem for child care providers, site-level factors may also be related to teachers' turnover decisions. Estimating relationships between job and teacher characteristics and turnover both across and within sites is important for a fuller picture of workforce dynamics.

Consequences of Turnover. High levels of turnover are concerning because turnover undermines the core functions of ECCE settings: supporting child development and providing stable care. There are many ways that turnover could undermine high quality learning opportunities for children. Most directly, children benefit from secure relationships with the adults in their lives and suffer from instability. Teacher turnover is negatively associated with children's development across a variety of domains (e.g., language and literacy, social, emotional, and regulatory skills, mathematics), and among infants and toddlers (Choi et al., 2019) as well as three and four year old children (Markowitz, 2024; Tran & Winsler, 2011). Turnover also matters for the teachers who remain at their site, take on additional duties (Bassok & Weisner, 2023) and experience added stress, as well as for leaders who must spend time on recruitment and onboarding, rather than on instructional leadership (Abel et al., 2017; Sorensen & Ladd, 2020). These "costs" for teachers and leaders may translate to lower quality learning environments for children.

In addition, turnover may undermine quality improvement efforts in child care settings. Early educators' skills grow over time, such that in their first three years new teachers improved by about two-thirds of a standard deviation on a widely-used measure of teacher-child interaction quality (Bellows et al., 2025). In losing educators early in their careers, this gain in skill is lost, and the field is bereft of mentor teachers and the kind of site stability that can build a healthy, collaborative culture. Additionally, any public dollars or site funds spent on providing professional learning opportunities for educators are lost if those teachers leave the field.

Beyond its connection to quality, turnover can also limit *access* to reliable child care. Sites that struggle with staffing also struggle to keep classrooms open and serve at licensed capacity. Sites may have long wait lists or turn families away due to teacher turnover (Bassok et al., 2022; Doromal et al., 2022; Hall, Fares, et al., 2023). For example, on a recent survey of Virginia child care providers, more than half of center directors reported that staffing challenges resulted in serving fewer children or turning families away. About a third reported they reduced the number of classrooms at their site due to staffing challenges (Bassok & Weisner, 2023).

The many ways in which turnover can harm ECCE quality and access suggest a need to better understand which teachers leave and why.

The Correlates of Turnover in ECCE

Researchers have studied predictors of ECCE teacher turnover for decades (Totenhagen et al., 2016), yet much of the work relied on small and/or now-outdated datasets and few studies have focused specifically on private child care settings, despite these being the most-used form of formal ECCE. Typically research on ECCE turnover is not specific to the child care sector, and considers the field broadly (e.g., across sectors, including, for example, child care, Head Start, and state pre-kindergarten together) or is focused on Head Start. Because both job characteristics (i.e., pay, role, age of children served) and teacher characteristics (i.e., experience, education, race) vary significantly across sectors, studies focusing specifically on child care settings are needed.

Indeed, although low wages and limited access to benefits are often cited as a core driver of turnover (Bassok, Hall, Markowitz, et al., 2021; Gable et al., 2007; Grant et al., 2019; Totenhagen et al., 2016; Whitebook et al., 2014), there are relatively few studies linking teacher-level data on wages to turnover in large child care samples. Even less common are studies of other teacher characteristics that may also predict turnover. The following sections review this modest literature.

Job Characteristics Linked to Turnover

While a body of research in labor economics and in K-12 educational settings suggests that job characteristics like pay, job demands, and job supports are linked to individuals' likelihood of staying in that job (Bruno, 2026), we have little evidence in the ECCE context specifically. We hypothesize ECCE teachers may mirror other low-wage workers (e.g., ASPE, 2004), though ECCE teachers may, as a group, have a high level of internal motivation and commitment to their work (Grant et al., 2019; Jeon et al., 2018) which may lead to some differences. We review the existing data below.

Teacher wages. Prior ECCE research hypothesizes a negative relationship between wages and turnover. On average, ECCE teachers, and child care teachers in particular, are paid very low wages—often at the level of minimum wage, and rarely meeting standards for a locally calculated living wage

(Markowitz & Bassok, 2024; McLean et al., 2024; Whitebook et al., 2014). In Virginia, the setting of the present study, child care teachers were paid on average $17.11 per hour for lead teachers, and $15.79 for assistant teachers, and more than two-thirds of lead teachers lived in households that made less than $45,000 annually in pre-tax income (Study of Early Education Through Partnerships, 2024). It is not surprising, therefore, that many report that the very low wages typically paid to early educators makes the job untenable in the long term (Bassok, Doromal, Michie, et al., 2021; Bassok, Shapiro, Michie, et al., 2021; Doromal et al., 2024; McLean et al., 2019; Totenhagen et al., 2016; Whitebook et al., 2014).

A recent, large-scale review of the existing data from the Building and Sustaining the Child Care and Early Education Workforce team highlighted more than 10 empirical studies demonstrating correlations between turnover and educators' economic well-being (Taylor, 2024). Data from wage supplement programs also suggests that higher wages are likely to be related to reduced turnover (Child Care Services Association, 2018; Gable et al., 2007, 2010). For example, a randomized study conducted in Virginia found that a relatively small wage boost of $1500 reduced teacher turnover in child care centers by 50% (Bassok, Doromal, Michie, et al., 2021). Data from Washington D.C.'s much larger Pay Equity Fund corroborates this finding (Doromal et al., 2024; Schochet, 2023).

Teacher Role. Conceptually, teacher role is likely related to turnover for several reasons. First, lead teachers are, on average, paid more than their assistant counterparts, and often receive more on-the-job supports (Hur et al., 2023; Markowitz & Bassok, 2024; McLean et al., 2024; Whitebook et al., 2014), factors that might be negatively related to turnover. Lead teachers may also have more experience on the job than assistant counterparts who are more likely to be individuals looking for temporary jobs or trying a new role for the first time. Relatedly, lead teachers who have either completed schooling specific to working in ECCE or who have been promoted after working as an assistant teacher may be more committed to ECCE work, making them more likely to stay.

Research exploring differential turnover rates by role is somewhat mixed, however. Some data suggests that teachers who hold higher positions (e.g., lead teachers, co-teachers, mentor teachers) are more likely to stay in the field than their counterparts in assistant or floater positions (Bridges et al., 2011;

Hur et al., 2023; Totenhagen et al., 2016; Whitebook et al., 2001), though the differences are often small (e.g., just a few percentage points). More recent data from Educare, a national nonprofit organization with the goal of providing high quality early learning, reports no difference in retention rate by role (Bryant et al., 2023). Variability in findings may be related to sample selection (e.g., type of site) and data type (e.g., administrative as compared to survey data).

Age of children. Teachers of infants and toddlers do work that is highly physical and requires a high level of attention and emotion regulation, which may lead to burnout (Burkhardt et al., 2025; Kwon, Ford, et al., 2020; Kwon et al., 2022; Sandilos et al., 2023). Teachers of infants and toddlers also often have lower levels of education and earn less compared to their peers who work with older children, even within the center-based child care sector (Markowitz & Bassok, 2024).

The limited existing evidence on this topic suggests that teachers of infants and toddlers turn over at higher rates than their peers working with preschool-aged children. In large scale, statewide data from Louisiana, teachers of toddlers were about 11 percentage points more likely to turn over than their peers working with older children in the child care sector specifically (Bassok, Markowitz, Bellows, et al., 2021), a pattern that persisted over a three-year period (Bellows et al., 2022).

Teacher Characteristics Linked to Turnover

Research in K-12 highlights the ways in which teacher characteristics are likely related to their turnover decisions, though patterns in ECCE are less clear. Below we review extant literature on teacher experience, education, and race/ethnicity.

Teacher experience. Teachers who have worked for more years in the field have both demonstrated commitment to the work and have grown in their ECCE expertise. As has been observed in K-12 settings (Redding & Henry, 2018; Redding & Nguyen, 2020), we expect turnover rates to decline as teachers' time in the field increases. For example, Bellows et al., 2022 find that 56% of a cohort of child care teachers in Louisiana left their site within one year. In the second year, turnover slowed down with an additional 18% of the original cohort leaving, and turnover in the third year was lower. Similarly, in a

sample of Educare teachers, authors find significantly steeper turnover rates in the early years of a teacher's career, which decline substantially over time (Bryant et al., 2023).

Teacher education. Like role, teacher education may be related to turnover for multiple reasons, with hypothesized relationships in contrasting directions. For example, teachers who attain more education specifically related to their work in ECCE (e.g., a Child Development Associate credential, CDA) may be more likely to stay, as their education level is indicative of their commitment to the field, and because they have invested in their skills. These individuals may also receive a commensurate compensation boost that supports their retention. In contrast, given that the relative wage penalty a teacher experiences for choosing a career in early education is smaller for teachers with lower levels of education (McLean et al., 2021), it may be that teachers who have higher education levels (e.g., a bachelor's degree) will be more likely to leave their roles, particularly if a higher paying job in another sector is available.

Research on the relationship between teacher education and retention yields inconsistent findings (Totenhagen et al., 2016). Whitebook and Sakai (2003) find no relationship between education level and turnover. Similarly, pre-pandemic data from Virginia revealed that a broad measure of education (e.g., high school diploma, some college, BA or more) had no relationship with turnover among lead teachers, but was associated with *decreased* turnover among assistant teachers (Bassok, Hall, Markowitz, et al., 2021). In contrast, in large scale Educare data, Bryant and colleagues (2023) report that teachers who had a BA were more likely to turnover. Such findings highlight the likely relevance of outside job opportunities, which are difficult to account for and likely to change over time as labor markets shift, and thus often unexplored in this literature. The present study will address these issues, in part, through a series of fixed effects models that identify teachers with similar outside occupational choices in a recent, post-COVID sample.

Teacher race and ethnicity. Compared to K-12 teachers, the ECCE workforce is more diverse and more similar in racial composition to the children they work with. This may have important benefits for children and families (Bates & Glick, 2013; Dee, 2004; Downer et al., 2016; Markowitz et al., 2020).

In the United States, longstanding structural inequalities in access to higher education, financial resources, health care, and other social services (Chetty et al., 2020; Redding & Baker, 2019) have resulted in different labor market outcomes for individuals of different racial and ethnic backgrounds (Banks, 2019; Hegewisch et al., 2019; Patten, 2016). This has also been the case within the ECCE sector, in which Asian, Black, and Hispanic early educators are more likely to work in lower-paying settings, work in assistant roles, and earn less than their white counterparts (Austin et al., 2019; Boyd-Swan & Herbst, 2019; Coffey, 2022; Kim et al., 2024; Lloyd et al., 2021). These factors may result in differential rates of turnover for educators based on racial/ethnic background.

At the same time, educators of color may face different choices in terms of other labor market options relative to their white peers; and may have different commitments to the specific work of early education (Burkhardt et al., 2025; Liang et al., 2000). For example, in Virginia, setting for the current study, the majority of Asian and Hispanic teachers live in areas with higher wages due to local labor market conditions, but then also face different labor options. These teachers also live in areas where more children and families may desire their specific language or cultural background in an educator, shifting teacher preferences. Evidence as to relationships between teacher identity and turnover is sparse, however. Recent, large data from Educare suggests that Black teachers may be less likely to leave their positions than their Hispanic or White counterparts (Bryant et al., 2023), but little other large data has explored this question.

Present Study

This study uses a unique, statewide, administrative data source and a set of fixed effects models to provide new insights on the relationship between job characteristics, teacher characteristics, and the likelihood teachers leave their child care positions. We ask:

1. To what extent are job and teacher characteristics related to teacher turnover in the universe of Virginia child care centers that receive public funds (e.g., through child care subsidies)?

2. Given that job and teacher characteristics can be highly correlated and can vary

systematically across regions and across sites: to what extent do job and teacher

characteristics relate to teacher turnover in within-region or within-site multivariate analyses?

Our study contributes to the literature in a number of ways. First, we use unusually large and detailed

recent data on over 14,000 early educators. The scope of this data, which includes job and teacher

characteristics as well as observed turnover, is unprecedented in child care research. In addition, as far as

we know, prior work in this area has largely focused on bivariate relationships and has not sufficiently

accounted for the fact that job and teacher characteristics are related to each other, and to other region or

site-specific factors. Our analysis aims to explore this complexity and provide a clearer and more nuanced

picture of teacher turnover in child care settings.

Method

We used data collected in the Virginia Department of Education's LinkB5 data system (LinkB5,

2025) between August 15 and October 1, 2023, and between August 15 and October 1, 2024. In fall 2023

and fall 2024, administrators at all publicly funded child care centers[4] serving children from birth to age

five[5] were required to enter information about their site and all employed teachers. After a site

administrator entered teacher information into the system, teachers completed a profile that included

questions about their hourly wage, role at the site, professional experience, educational background, and

demographics.

Sample Description

We limited our analysis to teachers employed at publicly funded child care centers that entered

data in LinkB5 in both fall 2023 and fall 2024. After excluding teachers who did not complete a teacher

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[4] Publicly funded centers includes centers receiving funds from any of these sources: Virginia Child Care Subsidy Program (CCSP), Child Care Access Means Parents in Schools, Mixed Delivery grants, Department of Defense Military Child Care Fee Assistance, local government child care assistance, Head Start, Early Head Start, the Virginia Preschool Initiative, Early Childhood Special Education or IDEA Part B.
[5] Sites that were licensed or registered through the Virginia Department of Education and served children of a minimum age of less than 2 months or more than 4 years were not required to participate. In fall 2023, these criteria excluded 143 sites.

profile in fall 2023 (N=1,467; 9% of teachers), our analysis included 14,373 lead and assistant teachers who were employed at 1,243 publicly funded child care centers in Virginia in fall 2023. Most teachers in the sample (82%) taught at centers that participated in the Virginia Child Care Subsidy Program (CCSP); the remaining teachers primarily taught in programs funded through the Department of Defense (12%).

Table 1 shows the job and personal characteristics of teachers in the sample (see below for details of how characteristics were defined). Teachers had an average hourly wage of $16.28, with over a quarter (29%) of teachers earning less than $14 per hour. Nearly two-thirds of the sample (63%) were lead teachers and more than half (52%) taught infants or toddlers (0-35 months). Teachers had a median of 5 years of work experience in early childhood care and education (ECCE), and few teachers (10%) were in their first year of working in ECCE. About half (46%) had a high school degree or less education, and only 5% had a degree beyond a Bachelors. Just over a third of teachers (36%) identified as White, non-Hispanic, and over a quarter (28%) identified as Black, non-Hispanic.

Measures

Outcome: Teacher Turnover

Our data included information about the site at which each teacher worked in fall 2023 and, for teachers who continued working in publicly funded ECCE, the site at which each teacher worked in fall 2024. Teachers and sites were assigned unique identifiers within the LinkB5 data system, allowing us to match teachers' place of employment in fall 2023 to their place of employment in fall 2024. We defined teacher turnover as a teacher no longer working in an instructional role with children ages 0-5 at their fall 2023 site in fall 2024. This definition includes leaving employment in ECCE altogether, moving to a different ECCE site, moving to a non-teaching position at the same site (e.g., becoming a program administrator), and moving to a teaching position at the same site in a classroom that only serves children older than 5 years. Teachers who met this definition of turnover were assigned a turnover value of 1; teachers who did not meet this definition were assigned a turnover value of 0.

Predictors

We used job and teacher characteristics collected in fall 2023 LinkB5 teacher profiles. We operationalized job characteristics as teachers' wages, their role at their site, and the age of the children they taught. Teacher characteristics, which are specific to a teacher irrespective of her job, include years of experience in ECCE, education level, and race/ethnicity.

Job Characteristics

Hourly wage. Teachers were asked the hourly wage they were paid at their site. Answer choices ranged from $0 to $40 ("$40 or more"). Responses below $12, the 2023 legal minimum wage in Virginia, were excluded (N=238). We treated hourly wage as a continuous predictor in regression models. For descriptive analyses, we divided responses into quartiles.

Role at site. Site administrators indicated whether each teacher at their site was a lead teacher or an assistant teacher. The VDOE did not provide a formal definition of lead and assistant teachers, so the classification was based on site administrators' understanding of the terms. Teachers also had the opportunity to change their role in their teacher profile.

Ages taught. Site administrators indicated the classroom(s) in which teachers worked by assigning teachers to classrooms in LinkB5. Each classroom was given one of three age levels based on the primary age of children taught: infant (0-15 months), toddler (16-35 months), and pre-K (3-5 years). Teachers were coded as "taught any infants or toddlers" if they were assigned to at least one infant or toddler classroom. Teachers who were assigned only to pre-K classrooms were categorized as teaching "preschool only."

Teacher Characteristics

Years of ECCE experience. Teachers were asked how long they had worked in ECCE in any position. Answer choices were reported in years and ranged from 0 ("Less than 1 year") to 51 ("More than 50 years"). We treated years of ECCE experience as a continuous predictor in regression models. For descriptive analyses, we categorized years of ECCE experience as less than 1 year, 1 year up to 2 years, 2 years up to 3 years, 3 years up to 4 years, 4 years up to 5 years, and 5 or more years.

Highest education level. Teachers were asked the highest degree they had attained. Answer choices were less than high school, high school diploma or GED, Child Development Associates, Associates, some college, Bachelors, some graduate, Masters, EdD, and PhD. We created four categories based on these answer choices: high school or less (less than high school or high school diploma or GED), post-high school education (Child Development Associates, Associates, or some college), Bachelors, and higher than Bachelors (some graduate, Masters, EdD, or PhD).

Race/ethnicity. Teachers were asked to select one or more categories to describe their race. Categories were American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, and White. Separately, teachers were asked whether they identified as Hispanic or Latino. Since many of the individual race categories contained few teachers, we collapsed race and ethnicity into four categories: Black or African American, non-Hispanic (selected only Black or African American and did not identify as Hispanic or Latino); Hispanic (identified as Hispanic or Latino, regardless of race selection); White, non-Hispanic (selected only White and did not identify as Hispanic or Latino); and other or multiracial, non-Hispanic (selected any other race category or multiple race categories and did not identify as Hispanic or Latino).

Analytic Strategy

We described statistical differences in turnover rates by job and teacher characteristics. We then estimated the relationship between job and teacher characteristics and the probability of teacher turnover, after controlling for unobservable labor market and site-level factors.

Differences in Turnover Rates by Job and Teacher Characteristics

We calculated the turnover rate for teachers in each category as:

$$\frac{100*(\# \ teachers \ in \ category \ with \ turnover=1)}{\# \ teachers \ in \ category}.$$

We then tested statistical differences between turnover rates across categories, where comparison groups were teachers with an hourly wage in the lowest quartile ([$12, $14]); assistant teachers; teachers teaching preschool only; teachers with less than one year of ECCE experience; teachers with high school or less education; and White, non-Hispanic teachers.

Linear Probability Models with Region Fixed Effects

We used linear probability regression models to estimate the relationship between job and teacher characteristics and the probability of teacher turnover. We recognized that there were unobservable labor market factors that might influence both job and teacher characteristics and turnover rates. For instance, some areas of the state may have concentrations of teachers with lower levels of education and wages as well as fewer job opportunities for child care teachers. To account for labor market factors, we used the Virginia Department of Education's nine regional child care organizations, called Ready Regions, to designate labor market areas across the state, and then included these regions as fixed effects in our models. We ran separate models with each job and teacher characteristic as a predictor, then ran a model including all job and teacher characteristics as predictors.

Linear Probability Models with Site Fixed Effects

Site-level differences could also influence both job and teacher characteristics and turnover rates. For example, a site with lower wages and less experienced teachers might also have poor working conditions, which could drive teachers to leave at higher rates. Since we cannot directly observe site working conditions, we ran models with site fixed effects to account for site-level factors. These site fixed effects models took the same form as the regional fixed effects models.

Sensitivity Checks and Extensions

In addition to our primary results, we ran three sets of supplementary analyses. First, linear probability models may not produce accurate results for a binary outcome (i.e., did a teacher leave their job). To test the sensitivity of our results to our choice of linear models, we also ran logistic fixed effects models with the same outcome and predictors and compared the predicted marginal probabilities from these models with the coefficients in the linear models. These results are reported in appendix tables A1

and A2. Logistic model results closely resemble those of the linear models, so we report linear model results for ease of interpretation.

Second, we ran analyses separately for lead and assistant teachers. Teachers in these two roles may have distinct responsibilities and requirements that could influence how job and teacher characteristics affect turnover. In our primary analysis we included a measure of teacher role as a predictor of turnover. However, it is possible there are differences in the relationships between job and teacher characteristics by role that we cannot observe in these models. To explore differences by role, we ran models separately for lead and assistant teachers. Results from these models are presented in appendix tables A3- A6.

Finally, our definition of turnover captures whether a teacher left their site, including both teachers who left publicly funded ECCE in Virginia altogether and those who left their site but continued working at a different publicly funded ECCE site. We repeated our analyses defining turnover as a teacher leaving publicly funded ECCE in Virginia. Results from these analyses are presented in appendix tables A7- A9.

Results

Differences in Turnover Rates by Job and Teacher Characteristics

Table 2 presents turnover rates by job and teacher characteristics. As a reminder, in this table, turnover is defined as teachers leaving an instructional role at their site over a one-year period. Overall, 38% of teachers who were in an instructional role in fall 2023 were not observed at their same site one year later. On average, turnover rates were highest for teachers with the lowest wages (contrasts between the lowest wage group and all other groups were statistically significant, $p< 0.001$). Among teachers with an hourly wage of $12 to $14, 45% turned over. In contrast, among those teachers who earned $18 or more an hour, the turnover rate was 27%.

Assistant teachers had a significantly higher turnover rate than lead teachers (43% compared to 35%, $p< 0.001$). Turnover was also higher for infant/toddler teachers compared to preschool teachers (39% compared to 35%, $p< 0.001$). Over half (54%) of teachers with less than one year of ECCE

experience left their site, considerably higher than the rates for all other experience categories (all contrasts $p< 0.001$). There was a 24-percentage point difference in the turnover rates of new teachers and teachers with 5 or more years of experience (54% compared to 30%). Descriptive patterns for education were less clear. Teachers with a high school diploma or less education were more likely to leave their positions than those with a BA, though that difference was relatively small (39% compared to 35%, $p< 0.01$), and no other contrasts were statistically significant. Compared to White, non-Hispanic teachers, Black, non-Hispanic teachers were more likely to leave their site, while Hispanic and other or multiracial teachers were less likely to turn over than White, non-Hispanic teachers ($p< 0.05$). Table A7 shows these patterns when turnover is defined as leaving publicly funded ECCE rather than leaving a specific site. Results were similar when using this alternative definition.

Linear Probability Models with Region Fixed Effects

Table 3 shows the results of linear probability models with Ready Region fixed effects, first looking at each predictor independently (models 1 through 6), and then all together (model 7). All discussed differences are statistically significant. In model 1, each $1.00 increase in hourly wage was associated with a 1.7 percentage point decrease in the probability of turnover. Being a lead teacher rather than an assistant teacher was associated with a 7.5 percentage point decrease in the probability of turnover (model 2). Compared to preschool teachers, infant/toddler teachers were 3.0 percentage points more likely to leave their sites (model 3). Experience was also a significant predictor of turnover, with each additional year of ECCE experience associated with a 1.1 percentage point decrease in the probability of turnover (model 3).[6] Having a BA compared to a high school degree or less education was associated with a 2.8 percentage point decrease in the probability of turnover (model 5). However, we did not find a significant difference in the probability of turnover for teachers with an AA or higher than a BA compared to teachers

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[6] The relationship between experience and turnover may be non-linear. To test this, we ran a model including categorical experience variables ([1,2) years, [2,3) years, [3,4) years, [4,5) years, 5 or more years) instead of continuous experience. These findings suggest that the relationship between experience and turnover may not be linear. Most of the decrease in the probability of turnover appears to come from retaining teachers past their first year in the profession, with additional reduction coming from staying in the profession for at least 4 years.

with a high school degree or less education. Compared to White, non-Hispanic teachers, Black, non-Hispanic teachers were 2.6 percentage points more likely to turn over after accounting for region; the probability of turnover did not differ for Hispanic or other/multiracial teachers compared to White, non-Hispanic teachers (model 6).

In model 7, after controlling for other job and teacher characteristics, the magnitude of the coefficient associated with a $1.00 increase in hourly wage was reduced by about half (b= -0.9, p< 0.001), and the coefficient associated with being a lead teacher compared to an assistant teacher was reduced to 3.3 percentage points (also around a 50% reduction; p< 0.01). Being an infant/toddler teacher was no longer associated with higher turnover in the full model. The magnitude and direction of the association between years of ECCE experience and turnover remained largely the same. In the full model, education was positively linked to turnover; that is, compared to having a high school degree or less education, higher levels of education were significantly associated with a higher probability of turnover. This pattern is a reversal from that shown in model 5. We continued to see significantly higher probability of turnover for Black, non-Hispanic teachers compared to White, non-Hispanic teachers. Additionally, in the full model the probability of turnover was significantly lower for other/multiracial teachers compared to White, non-Hispanic teachers.

Linear Probability Models with Site Fixed Effects

Results from models with site fixed effects, presented in Table 4, explore whether job and teacher characteristics relate to outcomes within sites. As in Table 3, models 1 through 6 present individual within-site relationships between each job and teacher characteristics, and model 7 includes all predictors simultaneously. Results largely mirror those presented in Table 3.

In model 1, we find that within a site a $1.00 increase in hourly wage was associated with a 1.8 percentage point decrease in the probability of turnover (p< 0.001), a similar magnitude to what was observed in the within-region model. The magnitude of the effect of being a lead teacher on the probability of turnover was larger in within-site models than in within-region models (-8.7 percentage points compared to -7.5 percentage points, model 2; both p<.001). In within-site models, teaching

infants/toddlers was not significantly associated with the probability of turnover. An additional year of ECCE experience was still associated with a 0.9 percentage point decrease in the probability of turnover after accounting for site factors (model 4; p<.001). In the within-site models neither education (model 5) nor race/ethnicity (model 6) were related to turnover.

In the within-site simultaneous model (model 7), results mirrored those of the within-region models. Wage was significantly negatively linked to turnover, though with a reduced magnitude relative to model 1 (b= -0.7, p< 0.001). Being a lead teacher was also negatively linked to turnover with a reduced effect size (b= -4.9, p< 0.001). Experience retained its significance and magnitude. In these within-site models we once again saw that teachers with more education were more likely to turn over relative to those with a high school diploma or less (AA or post-high school degree b= 3.3, p< 0.01; more than a BA b= 5.5, p< 0.05), though the coefficient for BA was not statistically significant. In the full model, teachers who identified as another race/ethnicity, non-Hispanic were less likely to turnover than their White counterparts (b= -5.5, p< 0.01).

Sensitivity Checks and Extensions

We performed three checks and extensions to help us better understand our findings. First, as noted above, we found no notable differences in main results when we used logit as compared to linear probability models in terms of statistical significance or magnitude (see Appendix Tables A1 and A2).

Second, because relationships between job and teacher characteristics and turnover may vary based on teacher role (Hur et al., 2023), we re-ran our main analyses separately for lead and assistant teachers. When we ran models with region fixed effects limited to lead teachers, we found patterns similar in direction and magnitude to the full group (Table A3). Among assistant teachers, however, we did not find significant associations between education level and turnover. Additionally, the relationship between race and turnover differed for assistant teachers. There was no difference in turnover for Black, non-Hispanic assistant teachers compared to White, non-Hispanic assistant teachers, while the probability of turnover was lower for Hispanic (b= -4.9, p< 0.05) and other/multiracial assistant teachers (b= -6.7, p< 0.05) compared to White, non-Hispanic assistant teachers (Table A4, model 6).

We then ran within-site models separately by teacher role. In models restricted to lead teachers, presented in Table A5, the magnitude of the hourly wage coefficient was larger in the lead teacher model (-1.0 compared to -0.7, model 7; both $p< 0.001$), as was the magnitude of the coefficients on education levels. Notably, in the models limited to lead teachers, we did not see the switch in sign between the independent model (model 4) and the full model (model 6). In both cases, having a degree higher than a BA compared to a high school degree or less education was associated with a higher probability of turnover (model 4, $b=6.5$, $p< 0.01$; model 7, $b= 9.4$, both $p< 0.01$). Table A6 presents the results of the within-site model limited to assistant teachers and shows that in the final model (model 6) only years of ECCE experience was significantly associated with turnover ($b= -1.0$, $p< 0.001$).

For our third sensitivity check, we ran additional models in which we replicated Table 3 and Table 4, but rather than examining the probability of a teacher leaving their site, we explored the likelihood they exited publicly funded ECCE in Virginia altogether. The region fixed effects models, presented in Table A8, yielded results largely consistent with our main results. One difference is that we did not find that Black, non-Hispanic teachers were more likely to exit publicly funded ECCE relative to White, non-Hispanic teachers, after controlling for other job and teacher characteristics. In the within-site models, presented in Table A9, we see similar findings to Table 4. Differences include a slightly smaller magnitude of the hourly wage coefficient (-0.6 compared to -0.7, both $p<0.01$), and a slightly larger estimated coefficient for being a lead teacher (-6.5 compared to -4.9, both $p<0.001$). Having higher than a BA compared to a high school degree or less education was not significantly associated with exiting publicly funded ECCE (Table A9, model 7), but having an AA or other tertiary schooling was positively and significantly related to turnover ($b= 2.2$, $p< 0.05$), though smaller in magnitude than estimated in Table 4.

Discussion

This study probes the relationship between a set of job and teacher characteristics and teacher turnover in a large, statewide sample of child care teachers working in sites that receive public funding in Virginia. Our large-scale data allowed for a nuanced exploration of factors related to turnover, accounting

for unobservable regional and site-level factors that may relate to turnover. We begin by summarizing our key findings.

Wages

Not surprisingly, we find teacher wage was consistently and negatively related to turnover. Teachers who are paid more—both relative to other teachers overall and other teachers at their site—are less likely to leave. This is true even after accounting for drivers of pay like teachers' role, experience, and education. This pattern aligns with teachers' reports of low satisfaction with pay and difficulty staying in a job that pays a poverty wage (Bassok, Shapiro, Michie, et al., 2021; McDonald et al., 2018; Schaack et al., 2020; Totenhagen et al., 2016; Whitebook et al., 2014). It also aligns with studies that show lower turnover rates in higher paying ECCE sectors (Bassok, Markowitz, Bellows, et al., 2021) and lower turnover in child sites that offer better pay (Bassok, Hall, Markowitz, et al., 2021), as well as recent evaluations of D.C.'s Pay Equity Fund (Doromal et al., 2024; Schochet, 2023). Quantitative and qualitative data have consistently demonstrated that although teachers feel strong internal motivation to do the work of care and education, wages are often not enough to keep teachers in their positions. Policy solutions that aim to improve the financial security of early educators are promising for reducing turnover and improving ECCE experiences for children and families (Bassok, Doromal, Michie, et al., 2021; Bassok, Markowitz, Miller-Bains, et al., 2021; Hall, Fares, et al., 2023; Markowitz & Bassok, 2024).

Role

Consistent with older data (Bridges et al., 2011; Totenhagen et al., 2016), we find a difference in likelihood of turnover based on teacher role: assistant teachers were more than 7 percentage points more likely to turnover than lead teachers, a difference of about 20%. This difference persisted in both region and site fixed effects models, and in models accounting for all other job and teacher characteristics. Our results on role differ from recent data from Educare (Bryant et al., 2023). One possible explanation is that Educare sites are, on average, more highly funded and high-quality than many sites receiving public funds. This suggests that while this strong relationship is due in part to other job and teacher characteristics, ultimately role is related to turnover rates.

Supplementary models that explored the relationship between job and teacher characteristics separately by role show that turnover operates differently across these two groups (Hur et al., 2023). Among lead teachers, we observed that wage, ages taught, experience, education, and race/ethnicity were all related to turnover. In contrast, only experience was related to turnover for assistant teachers. It may be that these differences are explained by differences between the two groups on unobserved characteristics. It could also be that differences in job responsibilities across lead and assistants may shape teachers' experiences and retention decisions. The findings highlight the importance of building pathways for assistant teachers to stay in the field. In order to create an educator pipeline in ECCE, future research should dive into the experiences of assistant teachers specifically and potentially explore how models of collaboration or professional support may shift teachers' experiences.

Ages Taught

In models only accounting for region, teachers working with infants and toddlers were more likely to turn over than their counterparts working with preschool-aged children. This means that the youngest learners—those children most likely to benefit from secure, stable relationships with caregivers—are most likely to experience teacher turnover. Notably, the association between age taught and turnover disappeared with the inclusion of other job and teacher characteristics. This finding reflects inequalities within ECCE related to working with younger children—specifically that teachers who work with younger children are often paid less, are newer to their sites, and have lower education levels. Policies that improve the structural differences in the experiences of ECCE educators working with younger children (Kwon, Malek, et al., 2020; Markowitz & Bassok, 2024) may eliminate the descriptive difference in turnover rates often observed.

Experience

Consistent with K-12 data and previous work in ECCE (Bassok, Hall, Markowitz, et al., 2021; Redding & Nguyen, 2020; Totenhagen et al., 2016), we find a persistent, negative relationship between years of experience and turnover. This finding remained significant in all models, including those with site fixed effects. Some turnover among new teachers is expected and likely beneficial, as teachers learn

whether ECCE work is a good fit for them. However, the very high rates of turnover among new teachers is concerning, particularly given recent evidence that the quality of teachers' interactions with children improve alongside their experience in the field (Bellows et al., 2025). Understanding how to support educators in the early years of their career—whether through onboarding, mentoring, supports for professional development, or other strategies—may be particularly effective in reshaping patterns of turnover in ECCE.

Education

Our findings on the association between teacher education and turnover highlight the importance of multivariate models. Specifically, in models that include only education and either region or site fixed effects, the relationship between education and turnover is either negative or non-existent. However, when all factors are added simultaneously, a clear pattern emerged showing that teachers with post-secondary education were more likely to leave once their higher wages were accounted for. While the evidence on the importance of education levels for ECCE quality remains mixed (Early et al., 2007; Manning et al., 2019; Markowitz & Bassok, 2025), to the extent that more educated teachers may provide higher quality learning opportunities for children (Markowitz et al., 2022) or that retaining more highly educated teachers in ECCE is important for professionalizing early care and education, this pattern is potentially troubling.

It is likely that, conditional on regional labor market factors and site level factors that may affect career advancement opportunities, teachers with more education face improved odds of finding a more preferred job than teachers with less education. In particular, teachers with more education may find it easier to switch to better paying ECCE sectors (e.g., Head Start, state pre-k). In Virginia, ECCE teachers in publicly funded child care centers who held a BA earned an average of around $18.98, whereas public school pre-kindergarten teachers with a BA+ earned an average of $30.59. Improving child care working conditions relative to other ECCE sectors is one way to avoid losing more educated teachers in this sector.

Race and Ethnicity

Associations between teacher race and ethnicity and turnover differed across models. In our descriptive tables we saw that Black non-Hispanic teachers were, on average, more likely to leave their sites than their White non-Hispanic counterparts, and that Hispanic teachers were less likely to do so. However, once we accounted for region and/or site, we no longer observed turnover differences between Hispanic teachers and their White non-Hispanic counterparts. In models that accounted for region fixed effects, we did see Black teachers were more likely to turn over than their White counterparts. However, we did not find these differences in models with site fixed effects, meaning that within sites, Black teachers are not more likely to leave their positions relative to their White counterparts. The sensitivity of the patterns highlights the correlation between race and ethnicity and both observable and unobservable factors. Teachers of color are more likely to earn less pay, work with younger children, and have lower levels of education. They also face a host of other barriers (Kim et al., 2024; Zhao & Jeon, 2024). Our findings underscore the importance of ongoing calls to consider the role of race and ethnicity in ECCE teachers' experiences, particularly given the disproportionate number of women of color in this field.

Implications for Policy and Research

This study used a unique, statewide data source that allowed us to explore the link between job and teacher characteristics and turnover in new and more detailed ways than most previous analyses. The inclusion of region and site level fixed effects, as well as a sample size that allowed for simultaneous modeling of our set of characteristics all created opportunities for new understanding. In doing so, the present study was able to corroborate and clarify many findings from the extant literature, as well as identifies core areas for future policymaking and research. First, we found that the low wages earned by early educators remains a significant issue, and a lever that is likely to matter for early educators across a variety of job and teacher characteristics. Consistent with national trends (McLean et al., 2019, 2024), early educators in our sample earned relatively low wages; 80% of our sample earned less than $18 per hour, a figure still about 30% less than a living wage for a single adult living in Virginia (Glasmeier, 2020). Early educators who earned more than $18 per hour were 18 percentage points less likely to leave their job than those who earned just over Virginia minimum wage ($12-$14 per hour, roughly 30% of the

sample). This stark contrast highlights how implementing strategies to support early educator compensation should be the first strategy to which policymakers turn. Recent policy actions in Washington, D.C. and New Mexico (Doromal et al., 2024; Schochet, 2023; Wilkes, 2022) suggest that such investments are possible, and are likely to lead to desired impacts.

Second, this study suggests that identifying strategies to support early career educators and to buttress the educator pipeline from assistant to lead may be particularly valuable. Early educators across roles and age groups were more likely to stay as they earned experience in the field, and this relationship was particularly strong for assistant teachers. Such findings highlight both the likely importance of teacher onboarding experiences, which remain understudied in the field, and clear teacher pathways from working as an assistant teacher, to a lead, and ultimately coaching or leadership positions. Distributed leadership models and other ways of reconceptualizing center structure, alongside efforts to provide commensurate increases in compensation as teachers' roles change, could help transform the workforce and enhance its stability (Bassok et al., 2023; Bassok, Herring, Markowitz, et al., 2021; Heikka et al., 2013, 2021; Heikka & Hujala, 2013; IOM & NRC, 2015; Markowitz & Bassok, 2024). Future research exploring these possibilities, particularly alongside policy investments, is important.

Third, we found that after accounting for other job and teacher characteristics (e.g., in our final models), education was consistently and positively related to turnover; that is, teachers with more education were more likely to leave their jobs, particularly lead teachers. It may be that teachers with post-secondary education have more attractive career options, making them more likely to leave. McLean and colleagues (2021) report that early childhood teachers with BA degrees earn, on average, 28% less than their peers working with older children, let alone peers in other fields. On exit surveys, early educators often report that wages were central to their decision to leave their job (e.g., Bassok & Weisner, 2022). If educators with BA degrees are more easily able to find work that offers higher compensation, then the ECCE field will continue to lose some of its most highly educated workers.

Finally, future research should take seriously the possibility that failing to account for region or local economic context may lead to inaccurate results. Our findings demonstrated that bivariate and

multivariate patterns often differed, and that the inclusion of teacher and job characteristics simultaneously clarified potentially theoretically confusing patterns. Continued efforts to build large datasets that allow for more complex explorations of turnover that consider both local and workforce conditions are essential for building effective policy.

Limitations

Despite the study's considerable strengths, there are a few key limitations to consider. First, this study is correlational. Even with the inclusion of site fixed effects we did not isolate the *impact* of any particular factor. More research on the causal factors driving turnover is needed.

Second, previous research has suggested that relationships between education and turnover may be nuanced and related to the type of educational experiences teachers have had. For example, pre-pandemic data from Virginia finds differential relationships between teachers who have a CDA and turnover, as compared to teachers who have a BA and turnover. This study was unable to look at the CDA or other ECE specific degrees, which is a key limitation.

Third, our measure of race and ethnicity included self-reported indicators for Black, non-Hispanic, Hispanic, White, non-Hispanic, and other race or ethnicity (including multiracial). While this classification structure is common in quantitative research, it does not begin to encapsulate the diversity of ECCE educators in Virginia. Moreover, as with any quantitative measure of race and ethnicity, it ultimately uses a proxy for teachers' racialized experiences, including structural factors related to their educational and occupational opportunities, as well as day to day interactions. This measure cannot capture what mechanisms may be particularly important in driving teachers' turnover decisions.

Conclusions

The present study identifies several important relationships between job and teacher characteristics and turnover in ECCE in a large, statewide sample of educators. These relationships, specifically those between wage, role, education, experience, and turnover, warrant future research, particularly the kind of studies that can identify the causal mechanisms that would allow for policy and practice intervention. Future work specifically targeted at keeping early teachers in the workforce and

making the job more sustainable and appealing relative to other careers is likely to be particularly

important.

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Table 1. Sample Characteristics.

N	14,373
Job Characteristics	
Mean hourly wage	$16.28 (3.60)
Hourly wage category	
[$12,$14]	4,089 (28.5%)
($14,$15.50]	2,550 (17.7%)
($15.50,$18]	3,635 (25.3%)
More than $18	2,825 (19.7%)
Missing	1,274 (8.9%)
Role	
Assistant	5,371 (37.4%)
Lead	9,002 (62.6%)
Ages taught	
Teaches any infant/toddler (0-35 months)	7,510 (52.3%)
Teaches preschool only (3-5 years)	5,223 (36.3%)
Missing	1,640 (11.4%)
Teacher Characteristics	
Median years of experience in ECCE	5
Years of ECCE experience	
Less than 1 year	1,496 (10.4%)
[1,2)	1,459 (10.2%)
[2,3)	1,542 (10.7%)
[3,4)	1,188 (8.3%)
[4,5)	928 (6.5%)
5 or more years	7,760 (54.0%)
Highest education level	
HS or less	6,534 (45.5%)
Post-HS education (AA, CDA, some college)	4,990 (34.7%)
BA	2,184 (15.2%)
Higher than BA	665 (4.6%)
Race/ethnicity	
Black, non-Hispanic	4,078 (28.4%)
Hispanic	2,193 (15.3%)
White, non-Hispanic	5,114 (35.6%)
Other or multiracial, non-Hispanic	1,295 (9.0%)
Missing	1,693 (11.8%)

Table 2. Turnover Rate from Site (%) by Job and Teacher Characteristics.

	Turnover Rate from Site (%)
All teachers	38.0
Hourly wage	
[$12,$14]	45.4
($14,$15.50]	40.2[***]
($15.50,$18]	37.2[***]
More than $18	26.6[***]
Missing	37.5[***]
Role	
Assistant	42.5
Lead	35.4[***]
Ages taught	
Teaches any infant/toddler (0-35 months)	38.6[***]
Teaches preschool only	35.4
Missing	43.5[***]
Years of ECCE experience	
Less than 1 year	54.1
[1,2)	46.7[***]
[2,3)	45.8[***]
[3,4)	46.4[***]
[4,5)	42.1[***]
5 or more years	29.9[***]
Highest education level	
HS or less	39.1
Post-HS education (AA, CDA, some college)	38.0
BA	35.1[**]
Higher than BA	37.0
Race/ethnicity	
Black, non-Hispanic	39.9[*]
Hispanic	33.6[**]
White, non-Hispanic	37.6
Other or multiracial, non-Hispanic	33.0[**]
Missing	44.2[***]

Notes: Turnover rates were calculated as $\frac{100*(\# \text{ teachers in category with turnover=1})}{\# \text{ teachers in category}}$, where turnover = 1 if a teacher was not observed working at their fall 2023 site in fall 2024. Comparison groups were teachers with a wage in [$12, $14]; assistant teachers; teachers who taught only preschool-aged children; teachers with less than 1 year of ECCE experience; teachers with HS or less education; and White, non-Hispanic teachers.

[*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$

Table 3. Linear Probability Regression Models with Region Fixed Effects Predicting Turnover from Site.

Predictor	Model 1: Hourly wage	Model 2: Role	Model 3: Ages taught	Model 4: Years ECCE exper	Model 5: Educ	Model 6: Race/ ethnicity	Model 7: Hourly wage, role, ages taught, exper, educ, race/ ethnicity
N	13,099	14,373	12,733	14,373	14,373	12,680	10,519
Intercept	65.62 (2.16)***	42.72 (0.66)***	35.50 (0.67)***	46.89 (0.55)***	38.86 (0.60)***	36.70 (0.71)***	57.97 (2.61)***
Hourly wage	-1.69 (0.13)***						-0.85 (0.16)***
Is a lead teacher		-7.54 (0.83)***					-3.25 (1.02)**
Teaches infants/ toddlers			3.03 (0.87)***				1.06 (0.95)
Years ECCE experience				-1.08 (0.05)***			-0.97 (0.06)***
Education							
AA or other post-HS					-1.17 (0.91)		3.60 (1.06)**
BA					-2.81 (1.21)*		3.23 (1.46)*
Higher than BA					-0.59 (1.98)		5.71 (2.43)*
Race/ethnicity							
Black, non-Hispanic						2.56 (1.06)*	3.08 (1.15)**
Hispanic						-0.84 (1.34)	-2.25 (1.44)
Other, non-Hispanic						-2.01 (1.57)	-4.72 (1.70)**

Notes: Table 3 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of teacher i in Ready Region j with the coefficient vector Γ, and α_j represents Ready Region fixed effects. In this model, turnover = 1 if a teacher was not observed working at their fall 2023 site in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were assistant teachers; teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4. Linear Probability Regression Models with Site Fixed Effects Predicting Turnover from Site.

Predictor	Model 1: Hourly wage	Model 2: Role	Model 3: Ages taught	Model 4: Years exper ECCE	Model 5: Educ	Model 6: Race/ ethnicity	Model 7: Hourly wage, role, ages taught, exper, educ, race/ ethnicity
N	13,099	14,373	12,733	14,373	14,373	12,680	10,519
Intercept	66.62 (2.72)***	43.47 (0.68)***	36.60 (0.68)***	45.58 (0.55)***	38.30 (0.62)***	37.25 (0.76)***	57.31 (3.37)***
Hourly wage	-1.75 (0.17)***						-0.73 (0.21)***
Is a lead teacher		-8.73 (0.88)***					-4.86 (1.15)***
Teaches infants/ toddlers			1.17 (0.92)				-0.55 (1.01)
Years ECCE experience				-0.92 (0.05)***			-0.80 (0.06)***
Education							
AA or other post-HS					-0.67 (0.95)		3.28 (1.13)**
BA					-0.96 (1.30)		2.79 (1.57)
Higher than BA					1.78 (2.06)		5.47 (2.57)*
Race/ethnicity							
Black, non-Hispanic						0.88 (1.25)	1.12 (1.36)
Hispanic						-0.58 (1.51)	-1.12 (1.64)
Other, non-Hispanic						-2.55 (1.69)	-5.47 (1.86)**

Notes: Table 4 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of teacher i at site j with the coefficient vector Γ, and α_j represents site fixed effects. In this model, turnover = 1 if a teacher was not observed working at their fall 2023 site in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were assistant teachers; teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A1. Logistic Regression Models with Region Fixed Effects Predicting Turnover from Site.

Predictor	Model 1: Hourly wage	Model 2: Role	Model 3: Ages taught	Model 4: Years exper ECCE	Model 5: Educ	Model 6: Race/ethnicity	Model 7: Hourly wage, role, ages taught, exper, educ, race/ethnicity
N	13,099	14,373	12,733	14,373	14,373	12,680	10,519
Hourly wage	-1.93 (0.33)***						-0.97 (0.19)***
Is a lead teacher		-7.46 (1.25)***					-2.68 (0.97)**
Teaches infants/ toddlers			3.04 (1.40)*				1.06 (1.01)
Years ECCE experience				-1.21 (0.06)***			-1.09 (0.06)***
Education							
AA or other post-HS					-1.16 (1.62)		3.79 (1.39)**
BA					-2.85 (2.35)		3.42 (1.86)
Higher than BA					-0.58 (3.03)		6.15 (2.06)**
Race/ethnicity							
Black, non-Hispanic						2.52 (2.02)	3.08 (2.13)
Hispanic						-0.88 (2.62)	-2.14 (2.39)
Other, non-Hispanic						-2.10 (0.96)*	-4.77 (1.37)**

Notes: Table A1 presents results, converted to changes in predicted probability, of the model

$$\ln\left(\frac{P(turnover_{ij}=1)}{1-P(turnover_{ij}=1)}\right) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$$, where X_{ij} represents characteristics of teacher i in

Ready Region j with the coefficient vector Γ, and α_j represents Ready Region fixed effects. In this model, turnover = 1 if a teacher was not observed working at their fall 2023 site in fall 2024. Changes in predicted probability are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were assistant teachers; teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2. Logistic Regression Models with Site Fixed Effects Predicting Turnover from Site.

Predictor	Model 1: Hourly wage	Model 2: Role	Model 3: Ages taught	Model 4: Years exper ECCE	Model 5: Educ	Model 6: Race/ ethnicity	Model 7: Hourly wage, role, ages taught, exper, educ, race/ ethnicity
N	12,515	13,778	12,091	13,778	13,778	12,072	9,858
N sites	1,045	1,084	1,058	1,084	1,084	1,048	980
Hourly wage	-2.21 (0.25)***						-1.03 (0.26)***
Is a lead teacher		-8.96 (0.91)***					-4.39 (1.24)***
Teaches infants/ toddlers			1.21 (1.01)				-0.67 (1.10)
Years ECCE experience				-1.06 (0.06)***			-0.93 (0.07)***
Education							
AA or other post-HS					-0.69 (1.03)		3.80 (1.23)**
BA					-1.01 (1.33)		3.18 (1.64)
Higher than BA					1.90 (2.23)		6.38 (2.70)*
Race/ethnicity							
Black, non-Hispanic						0.88 (1.33)	1.23 (1.47)
Hispanic						-0.59 (1.65)	-1.04 (1.83)
Other, non-Hispanic						-2.71 (1.85)	-6.03 (1.97)**

Notes: Table A2 presents results, converted to changes in predicted probability, of the model $\ln\left(\frac{P(turnover_{ij}=1)}{1-P(turnover_{ij}=1)}\right) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon{ij}$, where X_{ij} represents characteristics of teacher i at site j with the coefficient vector Γ, and α_j represents site fixed effects. In this model, turnover = 1 if a teacher was not observed working at their fall 2023 site in fall 2024. Changes in predicted probability are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were assistant teachers; teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3. Linear Probability Regression Models with Region Fixed Effects Predicting Turnover from Site, Lead Teachers.

Predictor	Model 1: Hourly wage	Model 2: Ages taught	Model 3: Years of ECCE experience	Model 4: Education	Model 5: Race/ ethnicity	Model 6: Hourly wage, ages taught, experience, education, race/ethnicity
N	8,240	8,165	9,002	9,002	8,000	6,796
Intercept	61.46 (2.71)***	33.73 (0.80)***	45.07 (0.73)***	35.18 (0.81)***	33.33 (0.86)***	54.04 (3.24)***
Hourly wage	-1.54 (0.16)***					-0.93 (0.19)***
Teaches infants/ toddlers		1.60 (1.06)				0.52 (1.16)
Years ECCE experience			-0.98 (0.05)***			-0.89 (0.07)***
Education						
AA or other post-HS				0.63 (1.15)		5.25 (1.30)***
BA				-1.24 (1.47)		3.98 (1.75)*
Higher than BA				2.55 (2.31)		7.67 (2.82)**
Race/ethnicity						
Black, non-Hispanic					3.33 (1.29)*	4.17 (1.39)**
Hispanic					0.71 (1.72)	-0.30 (1.81)
Other, non-Hispanic					-0.61 (1.96)	-3.48 (2.09)

Notes: Table A3 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of lead teacher i in Ready Region j with the coefficient vector Γ and α_j represents Ready Region fixed effects. In this model, turnover = 1 if a lead teacher was not observed working at their fall 2023 site in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4. Linear Probability Regression Models with Region Fixed Effects Predicting Turnover from Site, Assistant Teachers.

Predictor	Model 1: Hourly wage	Model 2: Ages taught	Model 3: Years of ECCE experience	Model 4: Education	Model 5: Race/ ethnicity	Model 6: Hourly wage, ages taught, experience, education, race/ethnicity
N	4,859	4,568	5,371	5,371	4,680	3,723
Intercept	65.89 (4.11)***	39.21 (1.19)***	48.93 (0.83)***	43.19 (0.90)***	42.73 (1.21)***	60.57 (4.81)***
Hourly wage	-1.53 (0.27)***					-0.83 (0.30)**
Teaches infants/ toddlers		4.48 (1.50)**				2.32 (1.65)
Years ECCE experience			-1.20 (0.09)***			-1.21 (0.12)***
Education						
AA or other post-HS				-1.48 (1.53)		0.58 (1.81)
BA				-1.62 (2.17)		2.63 (2.69)
Higher than BA				-3.53 (3.90)		0.76 (4.87)
Race/ethnicity						
Black, non-Hispanic					1.82 (1.82)	1.06 (2.04)
Hispanic					-4.52 (2.16)*	-4.87 (2.38)*
Other, non-Hispanic					-5.07 (2.60)	-6.69 (2.93)*

Notes: Table A4 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of assistant teacher i in Ready Region j with the coefficient vector Γ and α_j represents Ready Region fixed effects. In this model, turnover = 1 if an assistant teacher was not observed working at their fall 2023 site in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5. Linear Probability Regression Models with Site Fixed Effects Predicting Turnover from Site, Lead Teachers.

Predictor	Model 1: Hourly wage	Model 2: Ages taught	Model 3: Years of ECCE experience	Model 4: Education	Model 5: Race/ ethnicity	Model 6: Hourly wage, ages taught, experience, education, race/ethnicity
N	8,240	8,165	9,002	9,002	8,000	6,796
Intercept	62.13 (3.78)***	34.95 (0.81)***	43.68 (0.76)***	34.15 (0.85)***	33.88 (0.95)***	55.00 (4.64)***
Hourly wage	-1.58 (0.22)***					-0.96 (0.27)***
Teaches infants/ toddlers		-0.55 (1.12)				-1.51 (1.24)
Years ECCE experience			-0.84 (0.06)***			-0.77 (0.07)***
Education						
AA or other post-HS				1.70 (1.23)		5.67 (1.43)***
BA				1.12 (1.63)		3.88 (1.93)*
Higher than BA				6.50 (2.50)**		9.38 (3.09)**
Race/ethnicity						
Black, non-Hispanic					1.29 (1.57)	1.68 (1.69)
Hispanic					1.72 (1.97)	1.20 (2.11)
Other, non-Hispanic					-0.75 (2.17)	-4.83 (2.34)*

Notes: Table A5 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of lead teacher i in site j with the coefficient vector Γ and α_j represents site fixed effects. In this model, turnover = 1 if a lead teacher was not observed working at their fall 2023 site in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6. Linear Probability Regression Models with Site Fixed Effects Predicting Turnover from Site, Assistant Teachers.

Predictor	Model 1: Hourly wage	Model 2: Ages taught	Model 3: Years of ECCE experience	Model 4: Education	Model 5: Race/ ethnicity	Model 6: Hourly wage, ages taught, experience, education, race/ethnicity
N	4,859	4,568	5,371	5,371	4,680	3,723
Intercept	56.44 (6.02)***	40.97 (1.29)***	47.66 (0.86)***	42.30 (0.95)***	43.29 (1.39)***	53.02 (6.97)***
Hourly wage	-0.91 (0.39)*					-0.36 (0.44)
Teaches infants/ toddlers		1.69 (1.73)				1.09 (1.93)
Years ECCE experience			-0.97 (0.11)***			-0.98 (0.13)***
Education						
AA or other post-HS				-0.15 (1.72)		0.62 (2.09)
BA				1.47 (2.44)		2.12 (3.06)
Higher than BA				0.61 (4.26)		3.00 (5.57)
Race/ethnicity						
Black, non-Hispanic					0.80 (2.29)	0.65 (2.62)
Hispanic					-5.94 (2.65)*	-5.34 (2.98)
Other, non-Hispanic					-4.68 (3.01)	-6.20 (3.45)

Notes: Table A6 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of assistant teacher i in site j with the coefficient vector Γ and α_j represents site fixed effects. In this model, turnover = 1 if an assistant teacher was not observed working at their fall 2023 site in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

$^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table A7. Comparison of Turnover Rates from Site and from Publicly Funded ECCE (%) by Job and Teacher Characteristics.

	Turnover Rate from Site (%)	Turnover Rate from Publicly Funded ECCE (%)
All teachers	38.0	31.1
Hourly wage		
[$12,$14]	45.4	38.6
($14,$15.50]	40.2***	32.8***
($15.50,$18]	37.2***	30.2***
More than $18	26.6***	20.4***
Missing	37.5***	30.6***
Role		
Assistant	42.5	36.6
Lead	35.4***	27.9***
Ages taught		
Teaches any infant/toddler (0-35 months)	38.6***	31.6***
Teaches preschool only	35.4	28.4
Missing	43.5***	37.7***
Years of ECCE experience		
Less than 1 year	54.1	48.4
[1,2)	46.7***	39.4***
[2,3)	45.8***	37.6***
[3,4)	46.4***	39.7***
[4,5)	42.1***	35.1***
5 or more years	29.9***	23.2***
Highest education level		
HS or less	39.1	32.4
Post-HS education (AA, CDA, some college)	38.0	30.5*
BA	35.1**	29.2**
Higher than BA	37.0	30.7
Race/ethnicity		
Black, non-Hispanic	39.9*	31.5
Hispanic	33.6**	27.3***
White, non-Hispanic	37.6	32.3
Other or multiracial, non-Hispanic	33.0**	25.3***
Missing	44.2***	36.3**

Notes: The turnover rate from site reflects the proportion of teachers in each category who were no longer employed at their fall 2023 site in fall 2024. The turnover rate from publicly funded ECCE reflects the proportion of fall 2023 teachers in each category who were no longer observed working in publicly funded ECCE in fall 2024. Comparison groups were teachers with a wage in [$12, $14]; assistant teachers; teachers who taught only preschool-aged children; teachers with less than 1 year of ECCE experience; teachers with HS or less education; and White, non-Hispanic teachers.

$* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

Table A8. Linear Probability Regression Models with Region Fixed Effects Predicting Probability of Turnover from Publicly Funded ECCE.

Predictor	Model 1: Hourly wage	Model 2: Role	Model 3: Ages taught	Model 4: Years of ECCE experience	Model 5: Education	Model 6: Race/ ethnicity	Model 7: Hourly wage, role, ages taught, experience, education, race/ethnicity
N	13,099	14,373	12,733	14,373	14,373	12,680	10,519
Intercept	55.86 (2.06)***	36.82 (0.63)***	28.53 (0.63)***	39.23 (0.52)***	32.06 (0.57)***	31.15 (0.67)***	50.10 (2.48)***
Hourly wage	-1.52 (0.12)***						-0.68 (0.15)***
Is a lead teacher		-9.07 (0.79)***					-5.17 (0.97)***
Teaches infants/ toddlers			2.99 (0.83)***				1.19 (0.90)
Years ECCE experience				-0.98 (0.04)***			-0.85 (0.05)***
Education							
AA or other post-HS					-1.91 (0.87)*		2.16 (1.00)*
BA					-1.73 (1.15)		3.69 (1.39)**
Higher than BA					0.10 (1.89)		5.09 (2.31)*
Race/ethnicity							
Black, non-Hispanic						-0.23 (1.01)	0.38 (1.09)
Hispanic						-1.32 (1.28)	-2.85 (1.37)*
Other, non-Hispanic						-3.89 (1.49)**	-6.12 (1.62)***

Notes: Table A8 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of teacher i in Ready Region j with the coefficient vector Γ, and α_j represents Ready Region fixed effects. In this model, turnover = 1 if the teacher was not observed working at any publicly funded ECCE site in Virginia in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were assistant teachers; teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A9. Linear Probability Regression Models with Site Fixed Effects Predicting Probability of Turnover from Publicly Funded ECCE.

Predictor	Model 1: Hourly wage	Model 2: Role	Model 3: Ages taught	Model 4: Years of ECCE experience	Model 5: Education	Model 6: Race/ ethnicity	Model 7: Hourly wage, role, ages taught, experience, education, race/ethnicity
N	13,099	14,373	12,733	14,373	14,373	12,680	10,519
Intercept	57.71 (2.62)***	37.42 (0.65)***	29.36 (0.65)***	38.26 (0.53)***	31.68 (0.59)***	31.65 (0.73)***	49.32 (3.22)***
Hourly wage	-1.63 (0.16)***						-0.55 (0.20)**
Is a lead teacher		-10.03 (0.85)***					-6.48 (1.10)***
Teaches infants/ toddlers			1.57 (0.88)				-0.08 (0.97)
Years ECCE experience				-0.87 (0.05)***			-0.75 (0.06)***
Education							
AA or other post-HS					-1.30 (0.92)		2.16 (1.08)*
BA					-0.89 (1.25)		2.82 (1.50)
Higher than BA					1.17 (1.99)		4.54 (2.45)
Race/ethnicity							
Black, non-Hispanic						-1.69 (1.20)	-1.34 (1.30)
Hispanic						-1.08 (1.45)	-2.13 (1.57)
Other, non-Hispanic						-4.64 (1.63)**	-7.07 (1.77)***

Notes: Table A9 presents results from the model $P(turnover_{ij} = 1) = \beta_0 + \Gamma X_{ij} + \alpha_j + \epsilon_{ij}$, where X_{ij} represents characteristics of teacher i at site j with the coefficient vector Γ, and α_j represents site fixed effects. In this model, turnover = 1 if the teacher was not observed working at any publicly funded ECCE site in Virginia in fall 2024. Coefficients are reported in percentage point units with standard errors in parentheses. Excluded comparison groups were assistant teachers; teachers who taught only preschool-aged children; teachers with HS or less education; and White, non-Hispanic teachers. Hourly wage and years of ECCE experience were continuous predictors.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$