



Teacher Turnover in Early Childhood Education: Longitudinal Evidence from the Universe of Publicly-Funded Programs in Louisiana

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This paper provides a longitudinal examination of teacher turnover across all publicly-funded, center-based early childhood sites in Louisiana. We follow 4,465 early educators teaching in fall 2016 up to seven times through the fall of 2019. We provide the first statewide estimates of within-year turnover in ECE, as well as the first statewide study tracking turnover rates in ECE over multiple years. We find high within-year turnover: about 10% of teachers observed in the fall are not teaching the following spring. We also show that over 60% of fall 2016 teachers are no longer teaching at the same site in fall 2019. Turnover is particularly high among child care teachers, teachers of toddlers, and new teachers.

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**Teacher Turnover in Early Childhood Education: Longitudinal Evidence
from the Universe of Publicly-Funded Programs in Louisiana**

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Abstract

This paper provides a longitudinal examination of teacher turnover across all publicly-funded, center-based early childhood sites in Louisiana. We follow 4,465 early educators teaching in fall 2016 up to seven times through the fall of 2019. We provide the first statewide estimates of *within-year* turnover in ECE, as well as the first statewide study tracking turnover rates in ECE over multiple years. We find high within-year turnover: about 10% of teachers observed in the fall are not teaching the following spring. We also show that over 60% of fall 2016 teachers are no longer teaching at the same site in fall 2019. Turnover is particularly high among child care teachers, teachers of toddlers, and new teachers.

Keywords: early childhood education, teacher turnover

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Early childhood education (ECE) can have a lasting impact on children's learning and their lives. The adults who teach and care for young children are the key drivers of high-quality early learning environments (IOM & NRC, 2015). Despite their importance, teachers who work with children aged 0 to 5 typically receive very low compensation and few professional supports.

In turn, ECE teachers leave their positions at high rates. Studies report annual turnover rates ranging from 26 to 40% (Totenhagen, et al., 2016); in Louisiana, the context for the current study, about 37% of ECE teachers working one year are gone by the next (Bassok, Markowitz, Bellows, & Sadowski, 2021).

These levels of annual ECE teacher turnover are troubling, and much higher than annual turnover rates among K-12 teachers, estimates of which range from 15 to 24% (Hanushek, Rivkin, & Schiman, 2016; Papay, Bacher-Hicks, Page, & Marinell, 2017; Redding & Henry, 2018). Young children benefit from stable relationships with caregivers (Sandstrom & Huerta, 2013; Markowitz, Bassok, & Hamre, 2017). High levels of turnover negatively impact children and create more stressful and chaotic environments for leaders and teachers who remain at the site (Cassidy, Lower, Kinter-Duffy, Hegde, & Shim, 2011). Turnover makes the provision of safe, consistent care difficult for sites (Whitebook & Sakai, 2003; Totenhagen, et al., 2016) and compromises

investments in quality improvement.

While existing estimates of *annual* turnover suggest a problematically unstable workforce, lack of administrative data (Whitebook, McLean, & Austin, 2018) has meant that key questions about the nature of turnover in ECE settings have not yet been examined.

We know little about within-year turnover, which is the type of turnover that is likely most damaging for young children and for site leaders, who must scramble to find replacements (e.g., Tran & Winsler, 2011; Markowitz, 2019). We know even less about long-term patterns of ECE teacher turnover. The inability to keep teachers over multiple years may compromise quality improvement efforts, as teachers improve quickly over their first few years teaching (Papay & Kraft, 2015; Ladd & Sorensen, 2017). With some exceptions, we also know very little about how turnover patterns vary by site or teacher characteristics.

In the K-12 context, longitudinal administrative data have facilitated nuanced examinations of within-year turnover (Redding & Henry, 2018; Redding & Henry, 2019) as well as patterns of longer-term retention (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Hanushek, Rivkin, & Schiman, 2016; Papay, Bacher-Hicks, Page, & Marinell, 2017). These estimates, coupled with information on heterogeneity in patterns by site or teacher characteristics, have helped policymakers target supports. This paper aims to bring this type of analysis

to the ECE context using unique data tracking all ECE teachers working at publicly-funded, center-based sites in Louisiana over a four-year period, including school-based pre-kindergarten, Head Start, and subsidized child care. Ours is the first study to follow a large cohort of ECE teachers longitudinally, and we address two questions:

- (1) What proportion of teachers working at publicly-funded, center-based ECE sites in the fall of 2016 were still employed at the same site or at any publicly-funded ECE site in the state in the spring of 2016, and each subsequent spring and fall, through fall 2019?
- (2) Do patterns of turnover vary by sector, age of children in the classroom, or whether the teacher is new to the site?

Teacher Turnover in ECE

There is a growing consensus that ECE turnover is high and has negative impacts on efforts to improve ECE (Bassok, Fitzpatrick, Loeb, & Paglayan, 2013; Phillips, Anderson, Datta, & Kisker, 2019; Bassok, Markowitz, Bellows, & Sadowski, 2021; Caven, Khanani, Zhang, & Parker, 2021). However, key dimensions of ECE turnover— including within-year turnover and turnover patterns beyond a single year— have been understudied.

While a large body of K-12 research has leveraged longitudinal data to ask wide ranging questions about teacher turnover over time (Atteberry, Loeb, & Wyckoff, 2017; Papay, Bacher-Hicks, Page, & Marinell, 2017; Ronfeldt &

McQueen, 2017), longitudinal data on the ECE workforce rarely exists. This has meant that ECE research typically focuses only on annual turnover (Caven, Khanani, Zhang, & Parker, 2021)

Focusing solely on annual turnover likely limits our understanding. For instance, we know very little about the prevalence of within-year turnover, even though losing a teacher *during* the school year is hypothesized to be most problematic for young children. One study examines how common it is for children to lose their teachers in subsidized child care (Tran & Winsler, 2011), and two provide estimates of within-year turnover for teachers in Head Start programs (Wells, 2015; Markowitz, 2019). However, to date, no studies have reported on within-year turnover for the broader ECE workforce.

Similarly, understanding sites' ability to retain teachers over time is important for understanding likely returns on investments in quality improvement (i.e. investments in professional development may not yield desired returns if most teachers are not at their sites beyond a couple of years). Whitebook and Sakai (2003), released nearly three decades ago, is the only study we are aware of that examines multi-year turnover in ECE. Of teaching staff at 92 child care centers, 76% of individuals employed in 1996 were no longer there by 2000 (Whitebook & Sakai, 2003). More recent estimates, based on larger samples, are needed.

Potential Moderators of ECE Teacher Turnover

Although the ECE workforce is diverse, to date, few studies have documented how annual turnover varies across ECE teachers, and none have done so for within-year or multi-year turnover. This paper considers three policy-relevant moderators: ECE sector, age of children in the classroom, and whether a teacher is new to the site.

Moderation by Sector

In the United States, public funds support three types of formal, center-based ECE: school-based pre-kindergarten, which is typically administered through local public school systems and may serve 3- or 4-year-olds; Head Start, a federal program targeted to children from birth through five from families with very low incomes and children with special needs; and private child care centers, which receive subsidies to serve children from families with low incomes of any age (e.g., from about 6 weeks onward). These sectors are funded at different levels, face different systems for quality oversight and regulation, and offer different compensation and professional growth opportunities for teachers. Teachers in child care centers are typically paid much less than teachers in the other two sectors (Whitebook, Phillips, & Howes, 2014). For example, in a recent survey of two large parishes in Louisiana, lead teachers at child care sites reported yearly salaries of approximately \$21,000, as compared to \$38,000 for teachers at

Head Start sites and \$41,000 for teachers in school-based pre-kindergarten (Bassok, Markowitz, Smith, & Oleson, 2019).

These differences likely contribute to differences in annual turnover across sectors. In Louisiana, 46% of child care teachers left their site in a single year, compared to 34% of Head Start teachers and 26% of teachers in school-based pre-kindergarten (Bassok, Markowitz, Bellows, & Sadowski, 2021). While within-year and multi-year turnover are hypothesized to also be highest in child care centers, no studies have made comparisons across sectors.

Moderation by Age of Children in the Classroom

Teachers in ECE settings work with children from birth through age 5, though age of children taught varies by sector: whereas school-based pre-kindergarten primarily serves four-year olds, Head Start and child care settings typically serve children birth through five. These differences in ages served across sectors, combined with the stark differences in pay across sectors, mean that the youngest learners—those who probably benefit most from stable relationships—face higher levels of teacher turnover. Indeed, in Louisiana, 31% of teachers working with preschoolers turn over from one year to the next, compared to 49% of teachers working with toddlers (Bassok, Markowitz, Bellows, & Sadowski, 2021).

Even within sector, teachers working with children of different ages may face somewhat different job demands, credentialing requirements, compensation

levels, and labor markets (e.g., a preschool teacher in a child care setting may be able to work with children in Head Start or school-based settings). One study suggested that ECE staff working with infants and toddlers earn less than ECE staff working with preschoolers (NSECE, 2013). If this is the case, turnover for the teachers of the youngest children may be higher as well.

Moderation by Teacher Entry Status

A third potential moderator is whether a teacher is new to the site. In the K-12 context, beginning teachers are considerably more likely to leave than teachers with more experience (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Papay, Bacher-Hicks, Page, & Marinell, 2017; Redding & Henry, 2019). This pattern may be even more pronounced for ECE teachers since – in some sectors – barriers to entry are quite low. For example, in Louisiana and many states, child care teachers do not need a college degree or certification to begin teaching. To date, we are aware of no studies that have examined whether teachers who are new to their ECE site are more likely to leave than those with more experience.

Present Study

This paper provides the first state-wide estimates of two policy-relevant types of ECE teacher turnover: within-year turnover and multi-year turnover. In addition, it describes how these turnover measures vary by ECE sector, child age, and teacher entry status.

Data and Methods

We use administrative data collected twice each year by the Louisiana Department of Education (LDOE) as part of their Quality Rating and Improvement System (QRIS), a statewide early childhood accountability system that is mandatory for all center-based ECE settings receiving public funds in Louisiana, including school-based pre-kindergarten, Head Start, and subsidized child care. As part of the QRIS, trained observers collect data every fall and spring in *every* classroom serving toddler- or preschool-aged children within *all* publicly-funded, center-based ECE sites. Our data, which stem from these observations, thus include the *universe* of lead teachers working at these sites.

We follow a cohort of teachers observed during the fall of 2016. Our sample includes 1,318 sites with 4,465 teachers. We restrict our sample to teachers at sites that were continuously open between the fall of 2016 and the fall of 2019. We do this to ensure we are capturing turnover – that is, voluntary or non-voluntary exits from operational sites—rather than site closures. This excludes 608 teachers who taught at the 218 sites that closed by the fall of 2019.

Creating a Longitudinal Dataset Tracking Teachers

Louisiana does not formally track teacher employment or exits in ECE settings. However, their QRIS, which mandates data collection in every classroom every fall and spring, provides a unique opportunity to track these

patterns. At each time point, observers identify lead teachers' names. This results in a list of all lead teachers working in publicly funded ECE at each time point.

We match teachers across a four-year period from fall 2016-fall 2019 (7 time periods in all) using their observer-reported names (Louisiana does not attach unique identifiers to ECE teachers). We use fuzzy matching algorithms to account for typos and different spellings in teachers; names across time points (for more information, see Appendix A).

Defining Turnover

We use the matched data to calculate the proportion of teachers who are no longer observed *at their same site* during subsequent time periods. This site-level turnover is likely most disruptive for children, families, and sites. Some teachers exit and then re-enter their sites (due to, for example, maternity leave). If a teacher is not observed in one time period but is observed the period prior and the period following, we count the teacher as having continued teaching.³

We also calculate the proportion of teachers who are no longer observed *at any publicly-funded, center-based ECE site* in Louisiana during subsequent time periods. This ECE-level attrition is relevant when considering the returns to public investments in quality improvement. For instance, the returns on a professional development or coaching intervention is different if teachers transfer the skills learned from one ECE program to another, relative to if they leave the field altogether.

Moderators of Turnover

Each observation in our data set includes information about sector type. We use this to determine if a teacher worked in a school-based pre-kindergarten, Head Start, or child care in the fall of 2016.

In Louisiana, observers use one version of their observation tool if the majority of children in a classroom are preschool-aged (3 to 5 years) and another version of the tool if children in a classroom are toddler-aged (15 to 36 months). We use the observation type to label teachers as working with preschoolers or toddlers based on their classroom in the fall of 2016.¹

Finally, we identify whether teachers are entrants or returning to a site during the fall of 2016 using the prior year of data. We classify teachers as “entrants” if they were not observed at their site in 2015-2016 (i.e., the previous school year). We classify teachers as “returning” if they were observed teaching at their fall 2016 site during either the fall of 2015 or spring of 2016.²

Analytic Approach

We calculate within-year teacher turnover as the proportion of teachers from our initial fall 2016 sample that remained at their site in the spring of that same school year. We then calculate the percentage of teachers still employed at their site as a lead teacher at each time period thereafter, emphasizing the proportion of teachers still employed at their site three years out. We present results in a modified survival graph, which shows the proportion of the initial

sample observed in each of the 6 subsequent time periods. We then disaggregate these patterns by our three moderators: sector, age of children in the classroom, and teacher entry status.

To determine whether teachers leaving their sites moved to other ECE sites or left publicly-funded, center-based ECE in Louisiana entirely, we also estimate the proportion of teachers from our initial fall 2016 sample that remained in ECE at *any* publicly-funded, center-based site in Louisiana during each time point, up until the fall of 2019. We similarly disaggregate these estimates by our set of moderators.

To account for the correlation across moderators—particularly sector and age—we also run discrete time survival models that include all moderators and community characteristics simultaneously.

Results

Table 1 presents descriptive statistics for our sample. In the fall of 2016, about two-fifths of teachers worked in school-based sites (40%), nearly one-fifth worked in Head Start, and the remainder worked in child care (42%). The majority of teachers (71%) taught preschoolers; but, as noted above, this varied by sector: while none of the school-based pre-kindergarten teachers in our sample taught toddlers, the majority of child care teachers (59%) did so. Nearly a third (31%) of teachers were new entrants, though this also varied by sector: Over

twice as many teachers in child care (44%) were entrants in the fall of 2016, compared to teachers in school-based pre-kindergarten (19%).

Within-Year and Multi-Year Turnover

The black bars in Figure 1 show the proportion of teachers observed in fall 2016 that remained at the site where they started over the following six time periods. The first one indicates that, by the spring of that same school year, only 89% of teachers were still at their sites. By the fall of 2017—one year after the panel begins— 68% of teachers from the initial sample were still teaching at the same site. In other words, about a third (32%) of teachers in our sample left from one fall to the next. At the end of three years, about two-fifths (39%) of the original sample were still teaching at the same site.

The white bars show the proportion of teachers working at *any* publicly-funded, center-based site in Louisiana. The black and white bars are quite similar, suggesting very little movement from one site to another. For instance, while 68% of teachers were still at their original site after one year, 72% were teaching at their site or at any publicly-funded site. Given the similarity, in the remainder of the paper we focus on site-level turnover. However, analogous results for turnover from any publicly-funded, center-based ECE site are presented in Appendix B and are substantively similar.

The figure highlights the percentage of teachers remaining out of the total number initially observed. We also examine the percentage of teachers who left at

each period, conditional on being at their site in the prior period. Table C1 (Appendix C) shows that teachers are much more likely to leave their sites sometime between the spring and the fall than between the fall and spring. In other words, teachers tend to leave positions primarily in the summer months. That said, we do consistently observe high rates of turnover between fall to spring (within-year turnover).

Moderation by Sector

As shown in Figure 2, overall estimates mask large differences by sector, with much lower turnover rates in school-based sites relative to child care centers. Whereas 4% of teachers at school-based sites left between the fall and spring of 2016-2017, nearly one-fifth (18%) of teachers at child care sites left over that same time period. Estimates for the percent of Head Start teachers leaving within the year (9%) are about twice as large as estimates for teachers at school-based sites and half the size of estimates for child care teachers.

After one year, 76% of school-based pre-kindergarten teachers were still at their site compared to 59% of child care teachers. This 17 percentage point “retention gap” stays relatively stable over time. By the fall of 2019, nearly half (49%) of teachers in school-based pre-kindergarten were still teaching at their initial site; in contrast, fewer than one-third (30%) of teachers in child care sites were teaching at their initial site. While that gap remains stable over time, Table C1 (Appendix C) highlights that, between each time period, a higher percentage

of remaining child care teachers left their sites than did Head Start or school-based pre-kindergarten teachers.

Moderation by Age of Children in the Classroom

Retention patterns of ECE teachers also vary by the age of children in the classroom. As shown in Figure 3, at every time point examined, teachers of preschoolers were more likely to still be at their site than teachers of toddlers. For example, 44% of the fall 2016 teachers of preschoolers were teaching at the same site in the fall of 2019; in comparison, only 27% of their counterparts teaching toddlers in the fall of 2016 were teaching at the same site in the fall of 2019.

Recall that school-based ECE in Louisiana serves only preschoolers, so these differential rates of turnover reflect, in part, sector differences. In Table C2 (Appendix C) we fully disaggregate turnover rates by sector and age of children in the classroom to examine whether *within-sector* differences in turnover rates by age of children served remain. We find that 35% of child care teachers of preschoolers and 43% of Head Start teachers of preschoolers were teaching at the same site in the fall of 2019; in comparison, only 27% of both child care and Head Start teachers of toddlers were teaching at the same site in the fall of 2019.

Moderation by Teacher Entry Status

The cohort of fall 2016 teachers were a mixture of entrants and returning teachers. As shown in Figure 4, entrants were more than three times as likely as returning teachers to leave their sites by the spring of 2017: over one-fifth (22%)

of entrants left their sites by the spring of 2017; in comparison, only 6% of returning teachers did so. By the end of three years, only about one-fifth (22%) of 2016 entrants remained at their initial sites; in contrast, about half of 2016 returning teachers remained at their site.

Here too patterns may reflect sector differences, as the proportion of new teachers is considerably higher in child care settings relative to the other sectors. In Table C3 we disaggregate these patterns by sector. When we examine turnover only among new entrants, we find that child care entrants had higher rates of turnover than Head Start or school-based entrants. After three years, only 17% of child care entrants were still teaching at their initial sites. In contrast, 28% of Head Start entrants and 33% of school-based entrants were teaching at their initial sites after three years. Sector-level differences in turnover are also evident among returning teachers, although differences are less pronounced.

Discrete Time Survival Models

Above we disaggregated key results by sectors to account for the correlation among our moderators (i.e., child care centers are considerably more likely to serve toddlers and to employ new entrants than the other two sectors). We also address this issue by estimating discrete time survival models controlling for all moderators simultaneously. As shown in Table D1, all patterns are maintained and statistically significant even when all three factors are accounted

for simultaneously and we control for community-level variables that may affect teacher turnover.

Discussion

This paper is the first to use statewide data to document within-year and multi-year turnover in ECE settings. Using unique longitudinal data from Louisiana, we describe the prevalence of these under-studied types of turnover and examine moderation by several key characteristics that can inform policy response (sector, age of children in the classroom, and teacher entry status). Like prior research on *annual* teacher turnover, our study shows that ECE teachers leave—both their sites and ECE teaching more broadly—at very high rates.

A key contribution of our study is our ability to observe within-year turnover, which likely creates the greatest challenges for young children and sites. Our findings indicate that just between the fall and spring of the first year we study, 11% of early educators left their sites. This estimate is over twice as high as the within-year turnover rate for K-12 teachers in another southern state (4.6%) (Redding & Henry, 2018). When we consider turnover from the first fall of our panel to the next fall—an estimate more like commonly-reported annual turnover rates—we find that 32% of teachers left their sites. This means that roughly a third of early educators leave their sites from one year to the next, and about a third of these leavers exit during the typical fall-spring school year. Further, our

data suggest that nearly all teachers who leave their sites are leaving publicly-funded ECE in Louisiana entirely.

A second contribution of our study is the ability to track turnover over three years and seven time points. By the end of our time series, 61% of teachers left their initial site, and 55% left teaching in publicly-funded, center-based ECE in Louisiana altogether. That over half of early educators in publicly-funded ECE programs are gone within three years has serious implications for returns on large-scale teacher-centered quality improvement investments (e.g. coaching and professional development). These types of investments will only yield the benefits desired if coupled with efforts to reduce turnover both at sites and in the field more broadly.

To design such policies, a clear understanding of *which* teachers are leaving is necessary. This study provides three policy-relevant insights about the link between turnover and sector, age of children served, and teachers' years of experience within a site.

The first policy relevant insight is that all measures of teacher turnover are far more pronounced in child care settings than in Head Start or school-based pre-kindergarten. During the first year of observation (2016-2017), about 4% of school-based pre-kindergarten teachers left their sites between the fall and spring semesters, which is approximately the same rate reported in K-12 analyses (Redding & Henry, 2018). Within-year turnover among Head Start teachers was

more than double this rate (9%), an estimate similar to estimates of within-year turnover amongst the national Head Start workforce for 2006 and 2009 (10%) (Markowitz, 2019). Site-level turnover for teachers at child care sites was substantially higher still: during the first year of observation, 18% of teachers at child care sites left their sites (double the rate of Head Start teachers, and nearly four times as high as school-based teachers).

Similar sector-level gaps are evident when we consider multi-year turnover. For instance, three-year turnover estimates for school-based pre-kindergarten teachers are 51%, within the range of three-year turnover rates reported for K-12 teachers (36 to 55%) (Papay, Bacher-Hicks, Page, & Marinell, 2017; Hanushek, Rivkin, & Schiman, 2016). These rates are about 10 percentage points higher for Head Start, and 20 percentage points higher for child care. Indeed, fewer than one-third of child care teachers observed at the start of our panel are still at their sites three years later.

Our data cannot say why we observe these large sector differences, but differences in teacher compensation is one likely candidate explanation: school-based pre-kindergarten teachers have significantly higher wages and access to benefits than do teachers in the other sectors, particularly child care (Whitebook, Phillips, & Howes, 2014; Bassok, Michie, Cubides-Mateus, Doromal, & Kiscaden, 2020). In turn, child care and Head Start teachers are more likely to be food insecure or to report they are unable to afford basic expenses, such as

medical care, than school-based teachers (Bassok, Markowitz, Smith, & Oleson, 2019). School-based teachers also have greater access to professional supports (e.g., support staff, professional development) (Johnson, Martin, & Schochet, 2019). These financial and professional supports may explain why school-based pre-kindergarten teachers are far less likely to leave their positions.

A second policy-relevant finding is that turnover is considerably more pronounced among teachers of toddlers than it is among teachers of older children. At every time point we considered, teachers of toddlers were between 13 and 21 percentage points more likely to have left their sites than teachers of preschoolers. In some ways, this is an implication of the sector findings just highlighted. Preschoolers are more likely to be served in a sector (school-based pre-kindergarten) that provides teachers with higher levels of compensation and support; toddlers are most likely to be served in child care where teachers are compensated at lower levels and provided fewer supports. Given that toddlers both have substantial capacity for learning and may benefit most from stable relationships, this systematic difference is a problem (Sandstrom & Huerta, 2013).

Although a large part of the difference in turnover rates between teachers of toddlers and teachers of preschoolers is due to sector differences, we continue to see higher levels of turnover amongst teachers of toddlers even in models looking solely within child care and Head Start settings. This differential turnover may be driven by discrepancies in pay by age level or unique challenges

related to teaching toddlers. Alternatively, higher rates of turnover for the teachers of toddlers may result from these teachers switching between toddler and infant classrooms (the latter of which we cannot observe) more frequently than the teachers of preschoolers switch. Additional research can possibly uncover the underlying causes of this differential turnover and help inform policies designed to support the teachers of toddlers.

Finally, a third policy-relevant finding from our study is that the high rates of turnover observed in our data are driven in large part by the extremely high rates of turnover among teachers new to their sites. In our sample, teachers new to their sites were more than three times as likely to exit during the 2016-17 school year (22%) than were teachers returning to their sites (6%). Over three quarters of teachers (78%) who were new to their sites in 2016 were gone by 2019. While turnover was still high among teachers with more experience (53%), it was much lower than turnover rates for new entrants.

The turnover rates among new entrants are high both relative to ECE teachers with more experience and K-12 new teachers (Papay, Bacher-Hicks, Page, & Marinell, 2017; Redding & Henry, 2019; Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008). These high rates are particularly concerning in child care settings, where nearly half of child care teachers are entrants in any given year. Evidence from K-12 suggests that new teachers' learning curve is steep (Papay & Kraft, 2015; Ladd & Sorensen, 2017), and the high exit rates of new

ECE teachers likely means that most ECE teachers are not staying long enough at their sites to realize those improvements. As policymakers consider strategies to improve the knowledge and skills of ECE teachers, identifying supports that might keep beginning teachers in the classroom is essential. Otherwise, programs that invest in novice teachers' professional development will continue to serve a revolving door of participants, and classrooms will not benefit from the additional training provided.

Conclusion

Using unique data that follows all teachers in publicly-funded, center-based ECE across an entire state over three years, we find very high rates of both within-year and multi-year turnover, particularly in child care, for teachers of toddlers, and for entrants. Some amount of teacher turnover is expected and likely desirable. Indeed work from both K-12 and ECE shows that less effective teachers are more likely to leave (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Boyd, Lankford, Loeb, Ronfeldt, & Wyckoff, 2011; Bassok, Markowitz, Bellows, & Sadowski, 2021). Still, the rates of turnover documented in the current analysis are likely beyond this desirable level of churn and negatively impact children, families, and sites. That turnover is systematically clustered in particular sectors as well as with the teachers of the youngest children, is particularly troubling. Policy interventions that address the large differences in compensation across these sectors may be one important way to address these disparities

(Bassok, Dromal, Michie, & Wong, 2021). These interventions, coupled with policies aimed at supporting teachers who are new to their site and are the most likely to exit, may be particularly beneficial.

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Footnotes

1. In a small number of cases, teachers are recorded teaching different age levels in different years (37 teachers switch age level and site, and 212 teachers switch between age levels at the same site) or moving across sectors (61 teachers). Infant classrooms were not observed in 2016-2017 and are therefore excluded from all analyses.
2. Of “entrant” teachers (i.e., teachers who were not observed at their site in 2015-2016), the vast majority (84%) are new to ECE entirely (i.e., we do not observe them at another ECE site in Louisiana in 2015-2016).
3. Nearly 10% of our sample experience at least one missing period of observation but are later observed teaching at the same site. The majority of teachers re-entering, approximately 263 of the total 4,465 teachers (6%), are missing one time period but observed the prior and following period at the same site. Four teachers repeat this pattern multiple times. These teachers are recoded as being at the same site during their missing time period.

Table 1*Sample Descriptives*

	All	School	Head Start	Child Care
<i>Number of Sites (#)</i>	1318	608	163	547
<i>Number of Teachers (#)</i>	4465	1796	786	1883
<i>Age Level of Children Served (%)</i>				
Preschool (3-5 Years)	71	100	80	41
Toddler (15-36 Months)	29	0	20	59
<i>Entry Status (%)</i>				
Entrant	31	19	28	44

Note. Teachers are considered “preschool teachers” when the majority of children in a classroom are preschool-aged (3 to 5 years) and “toddler teachers” when the majority are toddler-aged (15 to 36 months). “Entrants” are teachers who were not observed at their site in 2015-2016; “returning” teachers were observed teaching at their fall 2016 site during either the fall of 2015 or spring of 2016.

Figure 1

Proportion of Fall 2016 ECE Teachers Remaining at Initial Site and in ECE

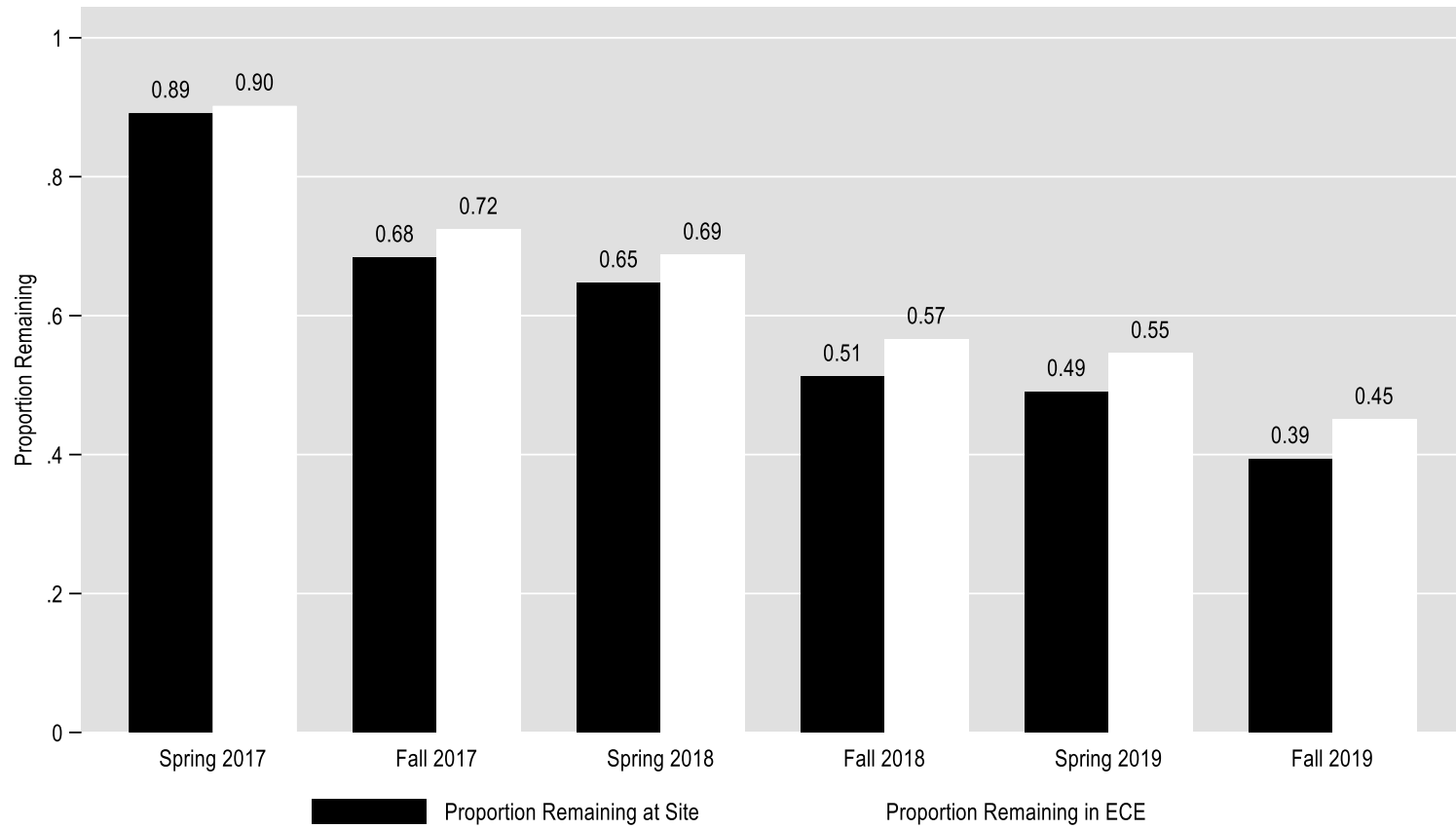


Figure 2

Proportion of Fall 2016 ECE Teachers Remaining at Initial Site, Disaggregated by Sector

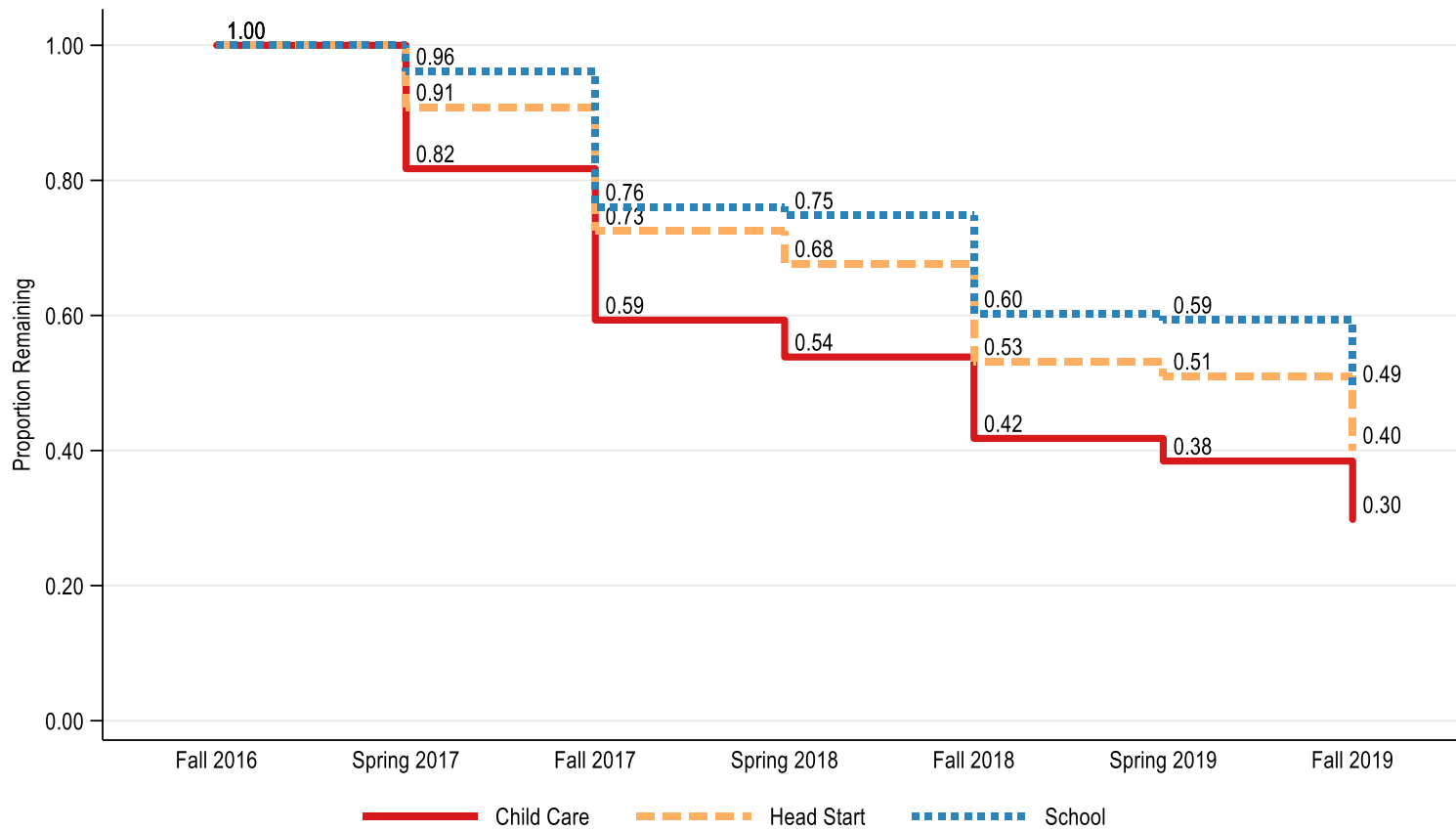
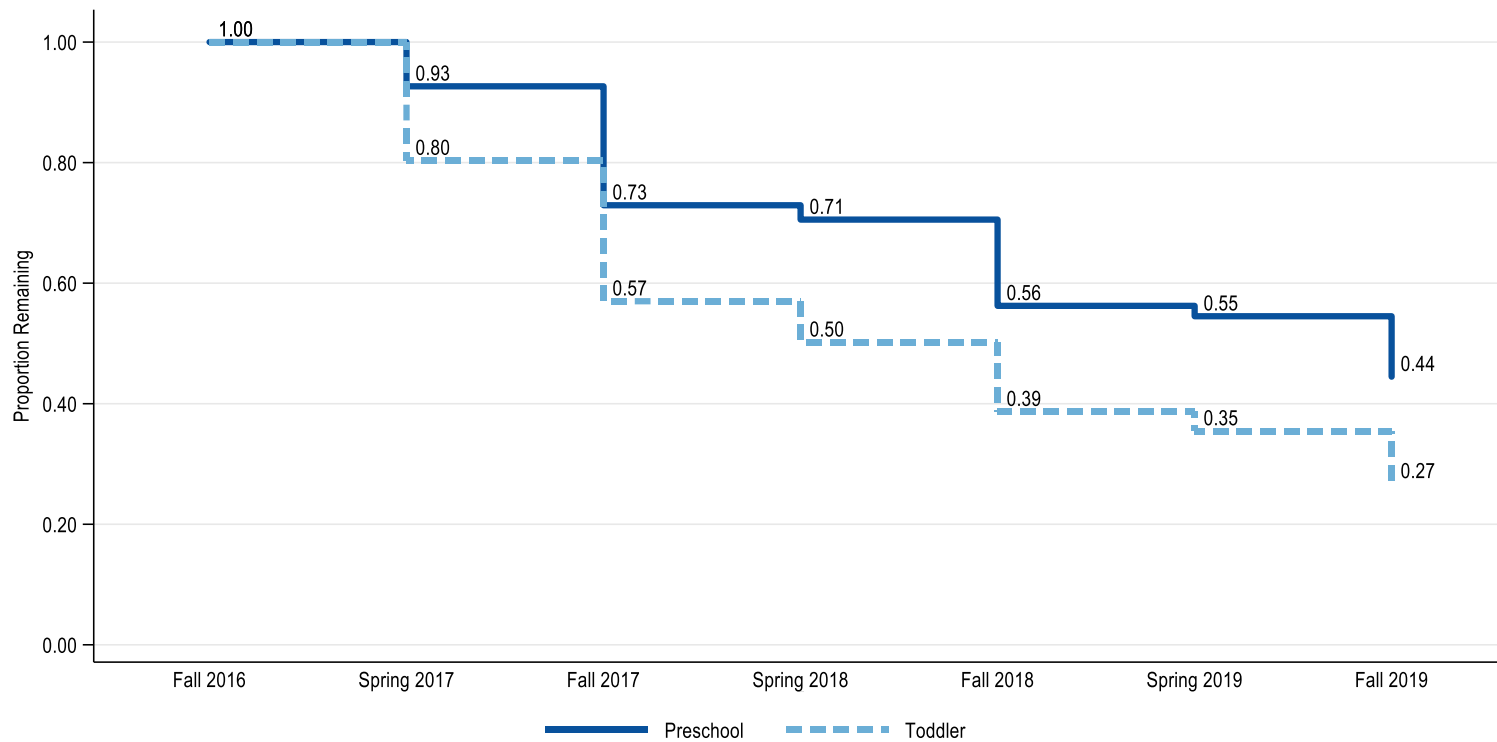


Figure 3

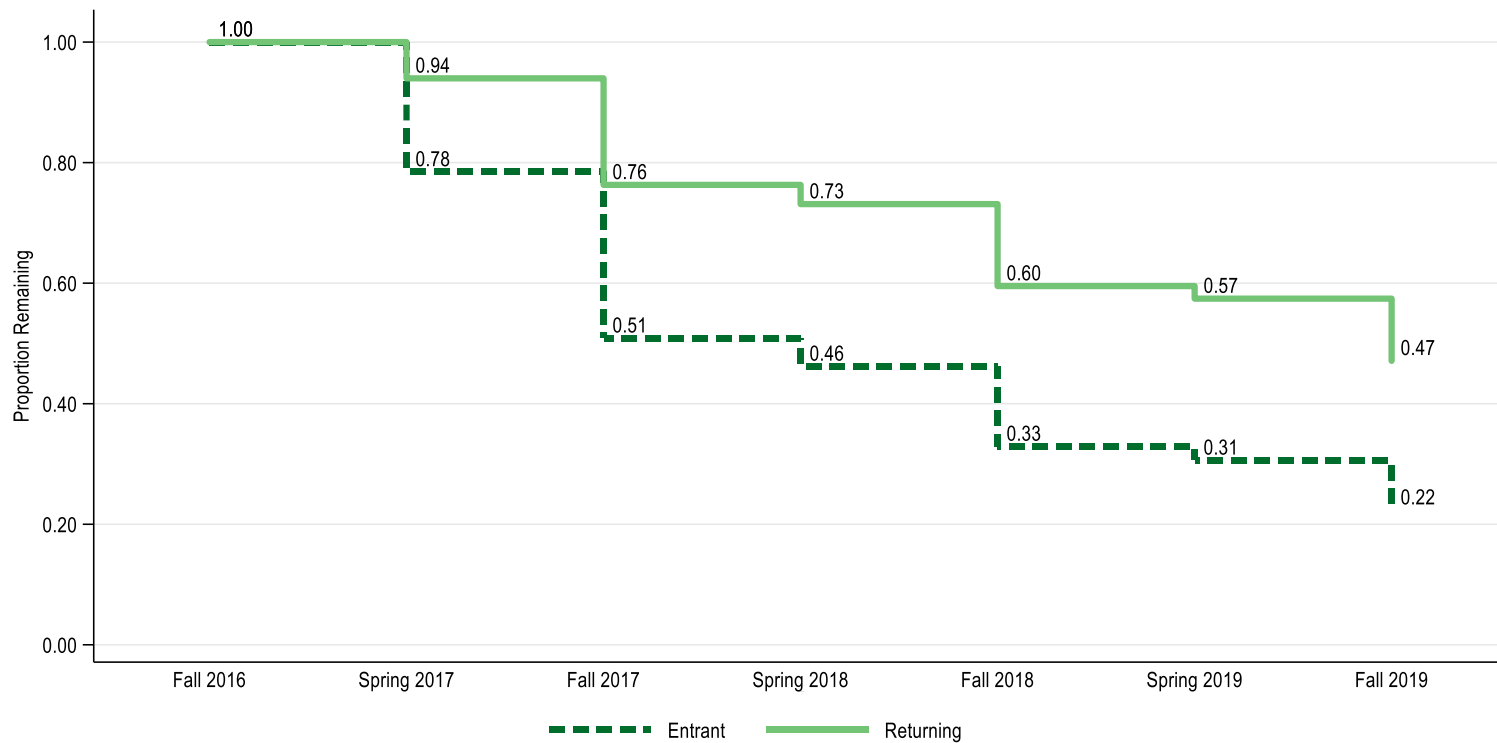
Proportion of Fall 2016 ECE Teachers Remaining at Initial Site, Disaggregated by Age of Children Taught



Note. Teachers are considered “preschool teachers” when the majority of children in a classroom are preschool-aged (3 to 5 years) and “toddler teachers” when the majority are toddler-aged (15 to 36 months).

Figure 4

Proportion of Fall 2016 ECE Teachers Remaining at Initial Site, Disaggregated by Entry Status



Note. “Entrants” are teachers who were not observed at their site in 2015-2016; “returning” teachers were observed teaching at their fall 2016 site during either the fall of 2015 or spring of 2016.

Appendix A

Louisiana mandates classroom observations in every ECE classroom every fall and spring. At each time point, observers identify lead teachers' names. Each observation is linked to the teacher leading the class during the observation. We matched teachers across time points using their names as reported by the observer. Teacher names sometimes had different spellings across time points. Additionally, teachers may also use slightly different first names from year-to-year (e.g., use nicknames) or change last names (e.g., upon marriage). We used fuzzy matching algorithms to account for typos and different spellings. We used matching algorithms (user-written `-matchit-` and `-relink-` in Stata) and self-created commands to account for typos and different spellings.

We first matched names within a school year (i.e., fall and spring observations). If we observed a teacher within the same classroom and year that had the same first name but different last name (or the same last name but different first names), we considered this teacher a match. We then used *both* versions of the teacher's name when conducting year to year matches. These rules were designed to avoid overstating teacher turnover.

When matching year to year, we first matched teachers within sites. If we observed a teacher with the same name at a site from year to year, we defined that teacher as continuing to teach at that site, even if the same name also appears outside of the site. If we could not identify a match within a site, we then matched

teachers within a parish, a local governance unit in Louisiana which is responsible for coordinating local observations and is similar to a county in size. We used the parish level because we theorized that teachers with the same name are more likely to be the same person within smaller geographical areas. If we could not identify a match within a parish, we matched teachers across the entire state. This last step identifies a very small number of likely matches. Our procedure could introduce error if some teachers who were identified as matches were, in fact, different people with the same name. In practice, however, this potential source of error was infrequent; few names (~1%) appeared across multiple sites.

LDOE policy directs observers to observe the classroom's lead teacher and observers are asked to enter the name of the lead teacher in the classroom. Occasionally they enter two names, which *may* represent two teachers leading the same classroom but may also represent a lead and assistant teacher combination. We assume all entered names are lead teachers. Since assistant teachers are likely more mobile than lead teachers and therefore unlikely to show up in observations during multiple time points, this may artificially inflate turnover estimates. However, there are not a large number of observations with multiple teachers entered, so we expect the magnitude of this error to be small.

The focus on classroom lead teachers in the QRIS data also leads to a few other data limitations. First, some teachers we classify as entrants may not be new to the site in a particular year but were working in an assistant teacher or other

role in the previous year. Similarly, if a lead teacher moves into a non-teaching position (to assistant director, for example) or to an infant classroom, we would inadvertently classify them as having left the site. Although this would inflate our turnover estimates, we expect the amount of inflation to be small. The focus on lead teachers working in classrooms is consistent with how teacher turnover is typically measured in K-12 settings.

Appendix B

Figure B1

Proportion of Fall 2016 ECE Teachers Remaining in ECE, Disaggregated by Sector

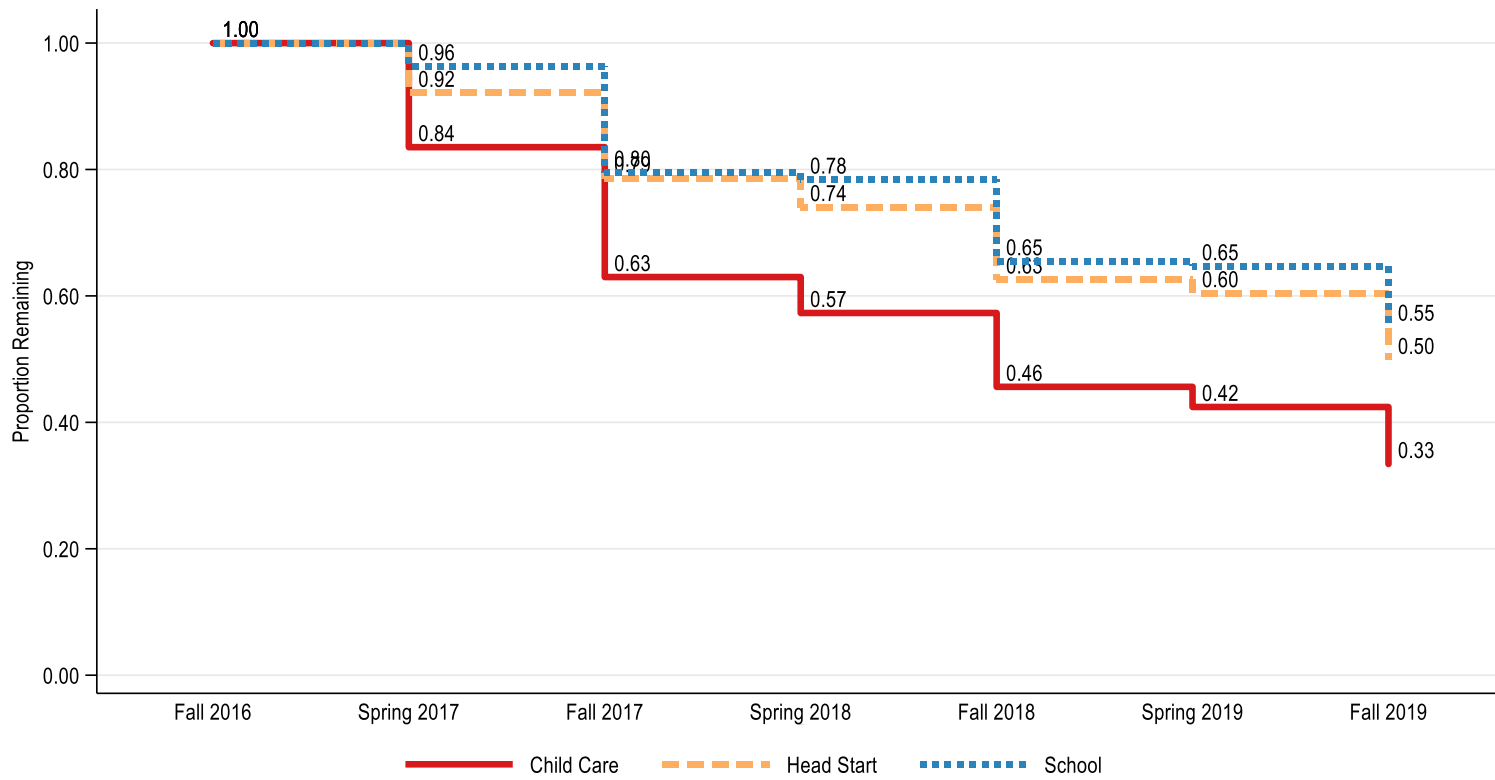
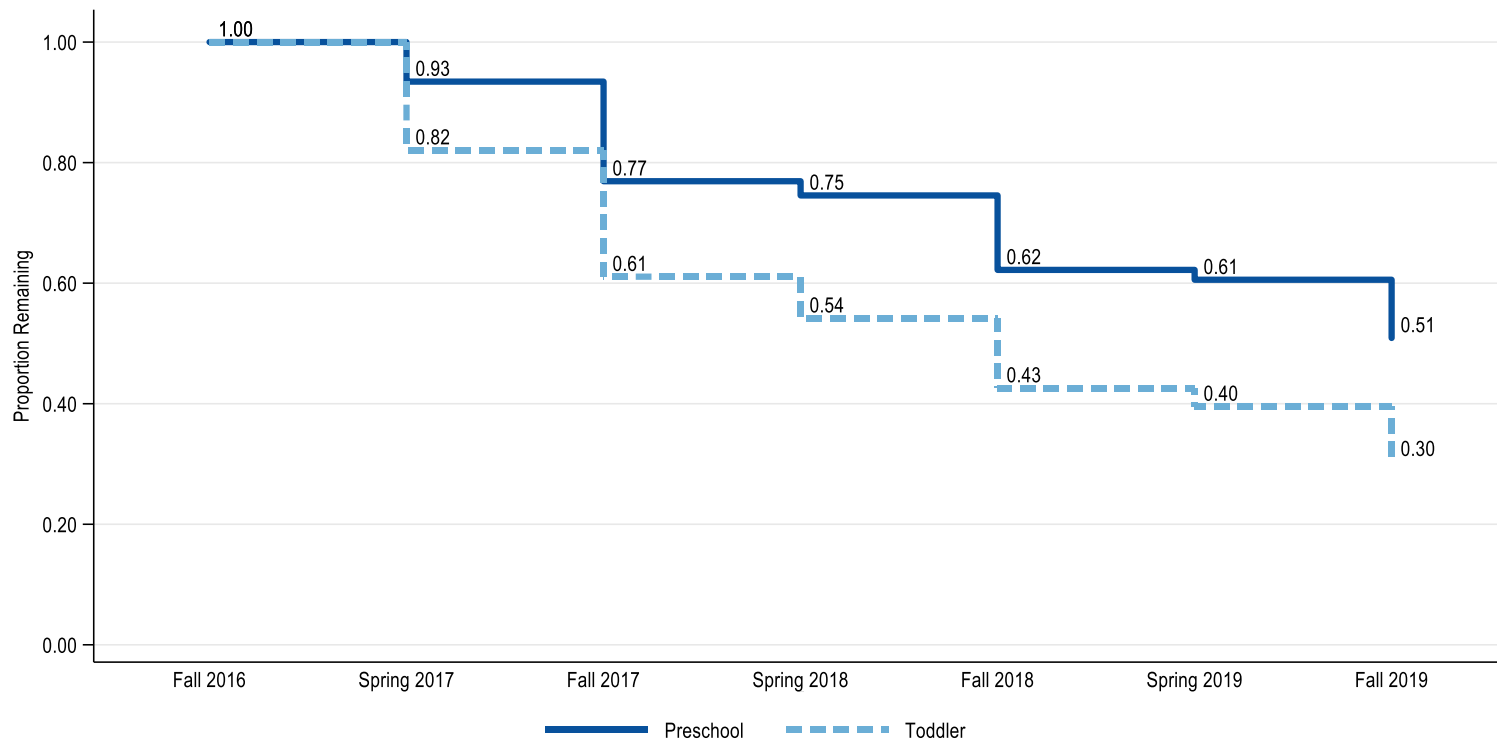


Figure B2

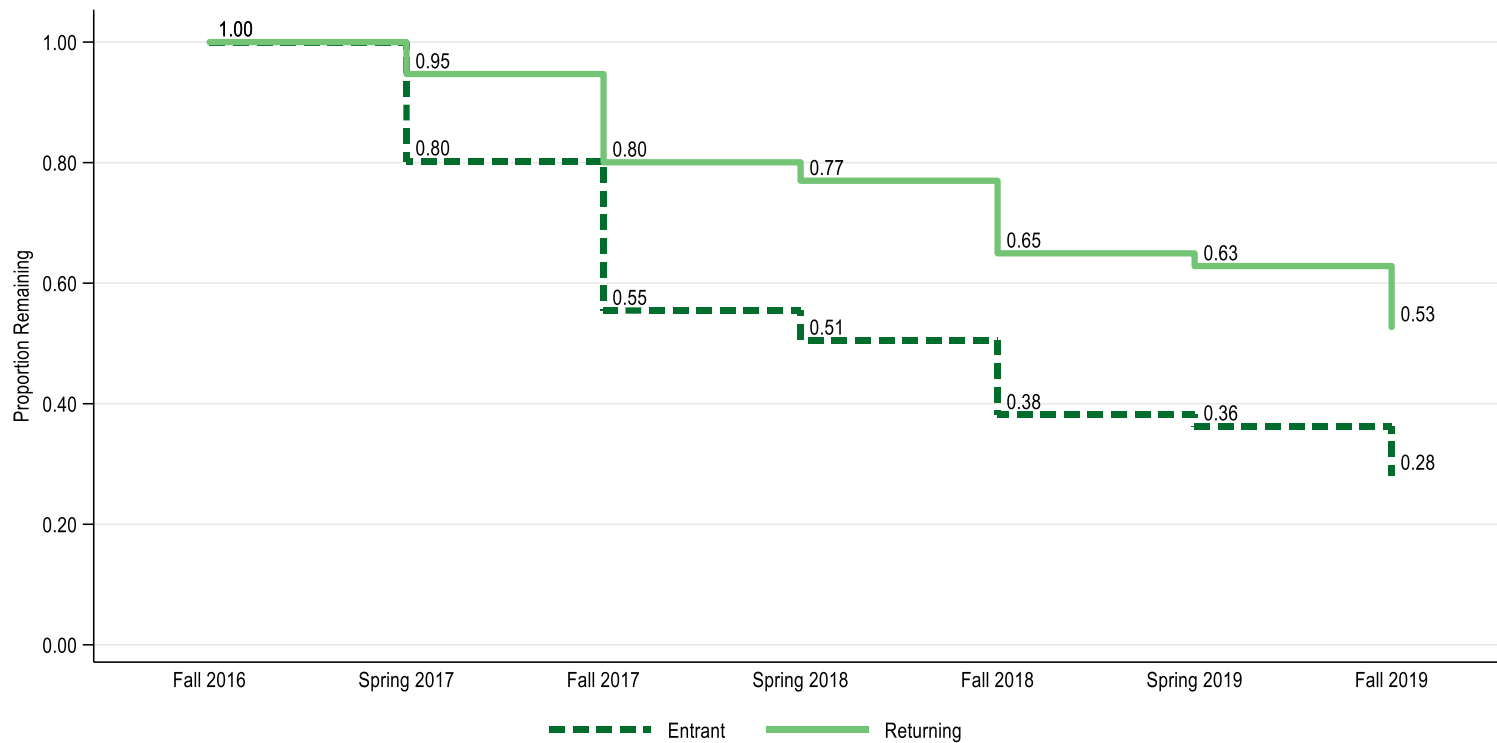
Proportion of Fall 2016 ECE Teachers Remaining in ECE, Disaggregated by Age of Children Taught



Note. Teachers are considered “preschool teachers” when the majority of children in a classroom are preschool-aged (3 to 5 years) and “toddler teachers” when the majority are toddler-aged (15 to 36 months).

Figure B3

Proportion of Fall 2016 ECE Teachers Remaining in ECE, Disaggregated by Entry Status



Note. “Entrants” are teachers who were not observed in ECE in Louisiana in 2015-2016; “returning” teachers were observed teaching in ECE in Louisiana during either the fall of 2015 or spring of 2016.

Appendix C

Table C1

Retention of Remaining ECE Teachers for Each Time Period, Disaggregated by Sector

Time Period	% of teachers leaving by time period			
	All	School	Head Start	Child Care
Fall 2016 to Spring 2017	11	4	9	18
Spring 2017 to Fall 2017	23	21	20	27
Fall 2017 to Spring 2018	5	2	7	9
Spring 2018 to Fall 2018	21	19	21	22
Fall 2018 to Spring 2019	4	1	4	8
Spring 2019 to Fall 2019	20	17	21	23

Note. “% of teachers leaving by time period” calculated as the number of teachers leaving between each time period, divided by the number of teachers remaining in the previous time period. For example, 23% of teachers in classrooms in the spring of 2017 left between the spring of 2017 and the fall of 2017.

Table C2*Proportion of Teachers Remaining by Time Point, Split by Sector and Age Group of Children*

Time Period	School	Head Start		Child Care	
	Preschool	Preschool	Toddler	Preschool	Toddler
	(%)	(%)	(%)	(%)	(%)
Fall 2016	100	100	100	100	100
Spring 2017	96	91	91	86	79
Fall 2017	76	73	69	65	55
Spring 2018	75	69	61	61	49
Fall 2018	60	55	46	48	38
Spring 2019	59	53	44	45	34
Fall 2019	49	43	27	34	27
Total Fall 2016 Teachers	1796	629	157	763	1120

Note. Teachers are considered “preschool teachers” when the majority of children in a classroom are preschool-aged (3 to 5 years) and “toddler teachers” when the majority are toddler-aged (15 to 36 months).

Table C3*Proportion of Teachers Remaining by Time Point, Split by Sector and Entry Status*

Time Period	School		Head Start		Child Care	
	Returning (%)	Entrant (%)	Returning (%)	Entrant (%)	Returning (%)	Entrant (%)
Fall 2016	100	100	100	100	100	100
Spring 2017	98	87	94	83	88	74
Fall 2017	80	61	77	62	71	44
Spring 2018	79	59	72	56	66	38
Fall 2018	64	45	59	39	54	26
Spring 2019	63	44	56	37	50	23
Fall 2019	53	33	45	28	40	16
Total Fall 2016 Teachers	1454	342	568	218	1051	832

Note. “Entrants” are teachers who were not observed in ECE in Louisiana in 2015-2016; “returning” teachers were observed teaching in ECE in Louisiana during either the fall of 2015 or spring of 2016.

Table C4

Retention of Remaining ECE Teachers for Each Time Period, Disaggregated by Entry Status

% of teachers leaving by time period			
Time Period	All	Returning	Entrant
Fall 2016 to Spring 2017	11	6	22
Spring 2017 to Fall 2017	23	19	35
Fall 2017 to Spring 2018	5	4	9
Spring 2018 to Fall 2018	21	19	29
Fall 2018 to Spring 2019	4	3	7
Spring 2019 to Fall 2019	20	18	27

Note. “Entrants” are teachers who were not observed in ECE in Louisiana in 2015-2016; “returning” teachers were observed teaching in ECE in Louisiana during either the fall of 2015 or spring of 2016. “% of teachers leaving by time period” calculated as the number of teachers leaving between each time period, divided by the number of teachers remaining in the previous time period. For example, 23% of teachers in classrooms in the spring of 2017 left between the spring of 2017 and the fall of 2017.

Appendix D

To determine whether our results hold for each moderator of interest (sector, experience, and age of children in the classroom) when we account for correlation between moderators, we estimate discrete time survival models, modeling time to turnover from initial site between the fall of 2016 and fall of 2019. We control for time using a series of time period indicators. Our primary variables of interest are the same moderators, based on teachers' classrooms in the fall of 2016. In alternative specifications, we allow age of children in the classroom to vary by year, since teachers could move from teaching to preschool to toddler-aged children within the same site. Results were not sensitive to this change.

In addition to these moderators, we add additional control variables on characteristics of sites' communities. Teachers may be more or less likely to stay at a site based on characteristics of children at that site, characteristics of the broader community in which the site is located, or surrounding economic conditions. These characteristics may additionally be related to our key moderators, such as the rate of children at child care centers rather than Head Start sites. We do not have information on the children served at each site; however, we are able to use site addresses to recover some information about the surrounding community using the American Community Survey (ACS) 2011-2016. We identify the percent of children under six in the site's Census tract who

are White, Black, and Hispanic, as well as the percent of children under six in the site's Census tract whose household falls below the Federal Poverty Line (FPL).

We additionally identify the female unemployment rate for each site's Census tract. We classify the site's Census tract as metropolitan, micropolitan, small town, or rural using the 2010 Rural-Urban Commuting Area (RUCA) Codes.

We run one specification controlling for sector (with child care as the base group) but also split models by sector.

Table D1*Results from Discrete Time Survival Models*

VARIABLES	(1) All	(2) Child Care	(3) Head Start	(4) Schools
<i>Sector of Site</i>				
Head Start	0.85** (0.06)			
School	0.70*** (0.04)			
<i>Age Level of Children Served^a</i>				
Toddler	1.32*** (0.08)	1.25*** (0.08)	1.44*** (0.18)	
<i>Entry Status^b</i>				
Entrant	2.12*** (0.10)	2.28*** (0.15)	1.83*** (0.21)	2.01*** (0.18)
<i>Rural-Urban Commuting Area Codes^c</i>				
Micropolitan Area	0.80*** (0.06)	0.89 (0.11)	0.74** (0.11)	0.75** (0.11)
Small Town	0.84** (0.07)	0.70* (0.13)	0.96 (0.15)	0.81 (0.11)
Rural Area	1.04 (0.18)	0.87 (0.37)	1.57 (0.59)	0.97 (0.21)
<i>Census Tract Demographics^d</i>				
Proportion of Under 6 Under FPL	1.01 (0.12)	0.92 (0.16)	1.00 (0.28)	1.25 (0.27)
Proportion of Under 6 Black	0.98 (0.08)	1.00 (0.13)	0.90 (0.19)	1.01 (0.15)
Proportion of Under 6 Hispanic	1.78*** (0.34)	1.61* (0.41)	2.84* (1.52)	1.68 (0.58)
Female Unemployment Rate	2.77*** (1.07)	2.61* (1.51)	4.53* (3.69)	1.95 (1.37)
Constant	0.09*** (0.01)	0.12*** (0.01)	0.07*** (0.01)	0.03*** (0.00)
Observations ^e	18,504	6,927	3,307	8,270

Note. Odds ratios are reported; standard errors are in parentheses.

^a Teachers are considered “preschool teachers” when the majority of children in a classroom are preschool-aged (3 to 5 years) and “toddler teachers” when the majority are toddler-aged (15 to 36 months).

^b “Entrants” are teachers who were not observed in ECE in Louisiana in 2015-2016; “returning” teachers were observed teaching in ECE in Louisiana during either the fall of 2015 or spring of 2016.

^c The 2010 Rural-Urban Commuting Area (RUCA) Codes classify Census tracts based on urbanization and community patterns. Here, only primary RUCA codes are used for metropolitan areas, micropolitan areas, small towns, and rural areas. Teachers are classified based on the Census tract of their site in the fall of 2016.

^d Census tract demographics use data from the American Community Survey (ACS) 5-year estimates ending in 2016, the first year of our study. Teachers are classified based on the Census tract of their site in the fall of 2016. FPL refers to the Federal Poverty Level.

^e 24 teachers were located at sites in the fall of 2016 for which addresses were unavailable or for which addresses could not be mapped to Census tracts. These teachers are not included in models.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$