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# Who Stays, Who Leaves: Five-year Retention Patterns by Teacher Entry Pathways

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**Author Note**

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# Abstract

California's teacher workforce has shifted markedly over the past decade, with the share of new teachers of record entering through student-teaching pathways falling from 63.5% to 39.4%, and the proportion entering on emergency permits rising from 10% to 30%. The percentage of beginning teachers on intern credentials—who are learning to teach while managing their own classrooms as paid teachers of record—has remained between 13 and 17% over the past decade. These pathway shifts coincide with growing diversity among beginning teachers, though Black/African American teachers remain disproportionately likely to enter teaching on emergency permits (52.2%) and to be placed in the highest need schools. Differences in preparation routes are strongly associated with early-career outcomes: preliminary credential holders entering through a student-teaching pathway show the lowest one- and five-year leaving rates (8.5% and 22.3%), while beginning teachers with emergency permits and out-of-state preliminary credentials face substantially higher attrition risks. These disparities compound over time, producing persistent racial gaps in retention, with Black/African American teachers experiencing the highest one-year (18.7%) and five-year (40.3%) leaving rates. Placement patterns further exacerbate these differences, as teachers entering through emergency and intern pathways—particularly Black/African American and Hispanic/Latino teachers—are more likely to begin teaching in schools serving the highest concentrations of high-need students. Despite these challenges, many teachers who start on emergency permits remain in the profession by entering student teaching or intern pathways, with 62% still teaching five years after entry and over one-third progressing to clear credentials. These findings underscore the importance of strengthening student-teaching and intern preparation pathways, developing supported on-ramps into residency, student teaching, or intern programs for emergency permit holders, and implementing targeted strategies to improve retention and diversify the educator workforce. Together, these actions can help stabilize California's teacher pipeline while promoting equity across preparation routes and school contexts.

*Keywords:* Beginning teacher preparation pathways; preliminary credentials; intern credentials; emergency permits; teacher attrition; teacher retention; teacher diversity.

# Objectives

Although there has been a rebound in the number of teachers newly credentialed in California since the COVID-19 pandemic (California Teacher Credentialing Commission, 2025), the shortage of qualified teachers in high-need fields (e.g., mathematics, science, special education, bilingual education) and high-need schools (e.g., those with a high percentage of students receiving free or reduced-price lunch or serving rural communities) persists. Students of color, particularly those identifying as Black/African American and Hispanic/Latino, are more likely to be taught by underprepared teachers (e.g., on an emergency permit) than their Asian American or White counterparts (Cardichon et. al., 2020; Carver-Thomas, Kini, & Burns, 2020). The combination of a shortage and unequal distribution of qualified teachers puts low-income and non-White students at an educational disadvantage.

Ensuring access to high-quality teaching for all children is essential for social and workforce success. California students typically perform below the national average, ranking in the bottom half or lower tier of states (approximately 26th to 44th, depending on the study). Although California experienced smaller learning losses than many states during the pandemic, it consistently ranks below top-performing states on the National Assessment of Educational Progress (NAEP), especially in math. As California works to improve student achievement for a student population that is becoming more linguistically and racially diverse, policymakers must focus on attracting and retaining well-trained teachers, diversifying the statewide teacher workforce, and increasing teacher retention (Policy Analysis for California Education, 2025).

This study examines California's teacher workforce through three linked lenses. First, we document how entry pathways into teaching have shifted over the past decade, with a declining share of teachers entering through traditional student-teaching routes and a growing reliance on emergency permits. Second, we examine how these entry pathways are associated with the schools in which teachers begin their careers, particularly with respect to student need and school working conditions. Third, we analyze how pathways and initial placements together relate to early-career mobility and retention. Taken together, these analyses illuminate how changes in the teacher pipeline shape not only who

enters teaching, but also where teachers begin their careers and how long they remain in the profession.

## Conceptual Framework

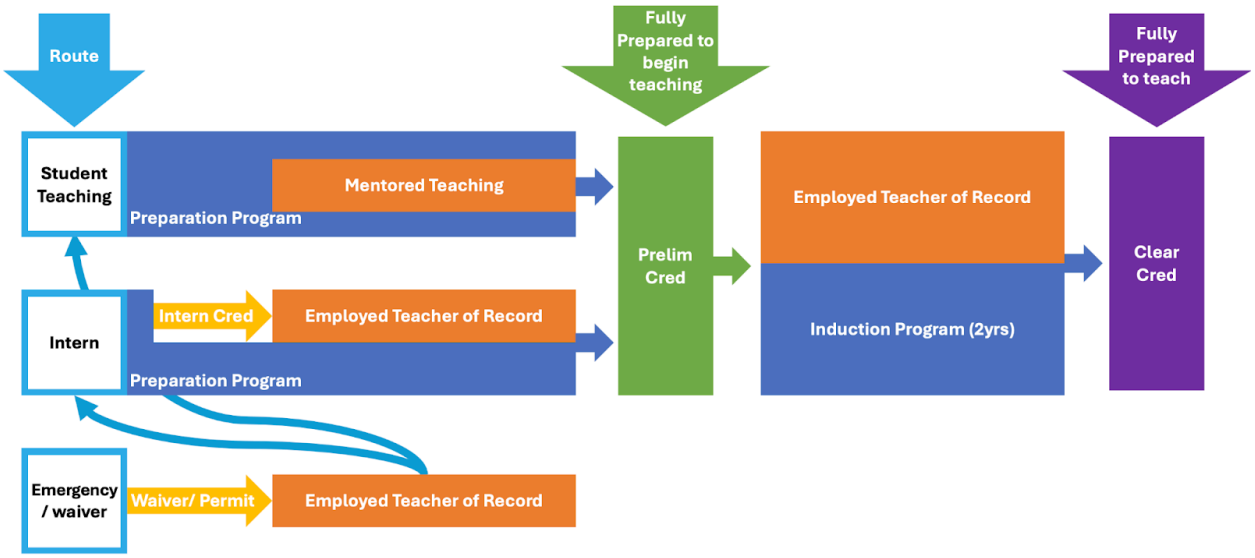
In this report, we examine the licensure and preparation pathways leading to employment as a first-time teacher of record in California (see Figure 1). The **student teaching pathway** includes at least 600 hours of mentored student teaching required as part of teacher preparation before gaining employment on a preliminary credential. Teachers completing this route are considered "fully prepared to begin teaching" when they enter their first classroom as teachers of record. Because of the current challenges in identifying teachers who completed residency programs in state data, they are included in the student teaching pathway in this report.

The **intern pathway** requires 120 hours of preparation before obtaining the intern credential, which allows the candidate to be employed and paid as the teacher of record while working towards completing the requirements (e.g., coursework; Teacher Performance Assessments) for the preliminary credential. While typically teaching alone in their classrooms, Interns are required to receive at least 144 hours of support and supervision annually (www.ctc.ca.gov). Most intern programs last two years, and teachers can work on an intern credential for up to three years.

When fully qualified teachers cannot be hired, districts can apply to the California Commission for Teacher Credentialing (CTC) for one-year **emergency permits**. These require a bachelor's degree and basic skills proficiency (CBEST). In this emergency pathway, permit holders serve as teachers of record. These permits include Provisional Internship Permits (PIPs), Short-Term Staff Permits (STSPs), Emergency Substitute Permits, and Emergency English Learner/Bilingual Permits. Provisional Internship Permits (PIPs) are for situations where a district cannot find a fully credentialed teacher and are renewable once. Short-Term Staff Permits (STSPs) are for positions that cannot be filled by a fully qualified person, typically in specific subject areas. STSPs are not renewable. For both STSPs and PIPs, employers are expected to support permit holders onto a pathway leading to a preliminary credential (e.g., an intern pathway).

New teachers who start on an **emergency permit** may not have on-the-job support (e.g., mentoring or induction) that teachers starting on an intern or a preliminary credential awarded after completing a student teaching program receive. However, employers must provide orientation for the new teacher and must assign an experienced educator to guide and assist the individual during the first year of teaching. If aspiring teachers on **emergency permits** want to continue teaching, they must pursue one of the pathways that prepare them to obtain the preliminary credential.

**Figure 1.** *California Licensure Routes to Teacher of Record*




Since the California Education Code prevents linkages between specific teachers and their students' assessments, much of the research on the outcomes of different entry pathways relies on national data or data from other states. The intern pathway in California most closely resembles alternative-certification (AC) programs in other states, in which teachers take educator preparation courses while serving as teacher of record. As the number of alternatively certified (AC) teachers has increased over time, evidence about their outcomes has also grown. Early studies showed little difference in student achievement between AC and traditionally certified (TC) teachers (Constantine et al., 2009; Kane, Rockoff, & Staiger, 2008; Seftor & Mayer, 2003). More recent studies, however, suggest student achievement differences between TC and AC teachers. In North Carolina, AC teachers have been found to have a small negative effect on student performance, especially at the high school level

(Clotfelter, Ladd, & Vigdor, 2010; Henry et al., 2014). In Texas, the number of teachers prepared through traditional university pathways continues to decline, while the number prepared through alternative pathways is rising. Rhodes & Marder (2024) found that for most subjects and grade levels, students learn significantly more from teachers trained in Traditional or Not-for-Profit programs (between 0.02 and 0.05 in standard deviation units) compared to Alternative and For-Profit programs.

Results of alternative certification have been more positive for highly selective programs, such as Teach for America (TFA). TFA teachers generally outperform their traditionally certified counterparts in similar schools on student achievement (Glazerman, Mayer, & Decker, 2006; Xu, Hannaway, & Taylor, 2011). In California, TC candidates outperform AC (Intern) candidates on the Teacher Performance Assessments (TPAs), with higher first-time pass rates (77% vs. 67%) and higher overall pass rates (92% vs. 88%) (Patrick, 2024). National data suggest that strong clinical support significantly increases TC candidates' likelihood of passing performance assessments, more than doubling their odds, a pattern not observed in AC pathways. These and other studies also typically report higher attrition rates among AC teachers than TC teachers (Guthery & Bailes, 2019; Redding & Smith, 2016).

California teachers serving on emergency permits are typically not considered part of a teacher preparation pathway. However, they, along with paraprofessionals, are key targets for "grow your own" teacher programs that recruit locally into intern programs, either run by local education authorities (e.g., County Offices of Education or School Districts) or higher education institutions, either in person or online. If teachers who start their careers on emergency permits can successfully transition to and complete intern or student-teaching pathways, they could be part of the solution to California's persistent teacher shortage.

For this study, we adopted a conceptual framework that emphasizes factors related to teacher turnover, based on meta-analyses and literature reviews (e.g., Borman & Dowling, 2008; Grissom et al., 2016; Nguyen et al., 2020). Previous research indicates that certain school characteristics where new teachers start—such as the percentage of low-income students and the average teacher attrition rate—are linked to their retention or decision to leave the profession (Grissom et al., 2016; Raue et al.,

2015). Therefore, we examined the proportion of beginning teachers who started their careers in schools with these features.

To better understand how the entry pathway affects the development of a diverse teacher workforce in California, we ask the following research questions:

1. What are the numbers and proportions of beginning teachers entering through various pathways (emergency permit; intern credential; preliminary credential through a student teaching pathway; preliminary credential from an out-of-state program), and how have these changed over time?
2. What are the demographic differences between teachers entering through various pathways, and how have these changed over time?
3. What are the characteristics of the schools where new teachers first start teaching, and the students they serve?
4. What do one-year turnover rates in teaching look like, and how do they differ by teachers' race/ethnicity and their entry pathway? To what extent are racial/ethnic differences in turnover explained by the entry pathway? What are other teacher or school-level predictors that predict turnover?
5. What are the relative risks of leaving teaching in California or moving schools during the first five years of teaching, and how do they differ by teachers' race/ethnicity and their entry pathway? To what extent are racial/ethnic differences in leaving and moving explained by the entry pathway? What are other teacher or school-level predictors that predict leaving or moving from a teacher's initial placement?
6. To what extent do teachers who enter teaching on emergency permits earn preliminary credentials and are still teaching after 3 and 5 years? How do these differences vary by race/ethnicity?

## Data

We examined teacher-level longitudinal data provided to the Learning Policy Institute (LPI) by two state agencies—the California Department of Education (CDE) and the California Commission on Teacher Credentialing (CTC). The CTC data includes credential information dating back to 2005, such as permit or credential type, issue date, and whether the credential is “active" in a given year. The CTC data also includes the subjects that teachers are authorized to teach. The CDE data covers school years 2012-13 through 2024-25 and enables us to track when teachers first began teaching, moved schools in California, and are no longer teaching in a California school. The CDE data also include teachers’ demographic characteristics. These data are linked to school-level characteristics by year. In this paper, we analyze data on new teachers of record.[1] who entered the classroom of traditional public or charter schools in California between the 2014-15 and 2024-25 school years (in certain instances, the analysis is restricted to a shorter time span due to concerns regarding data quality and availability), their pathways into the profession, and the schools and students they served. Specifically, we examine:

- Demographics of beginning teachers (e.g., gender, race/ethnicity, age)
- First credential type (i.e., preliminary credential earned through a student teaching pathway, an intern pathway, or an emergency permit pathway, including short-term staff permit, provisional internship permit, teaching permit for statutory leave, and multiple subject, single subject, and education specialist credentials with waiver). We also include beginning teachers with a preliminary credential who completed teacher training outside of California. While these teachers would be new to California classrooms, they may have experience teaching in another state or country.
- Credential area (multiple subjects, single subject, and education specialist) and subject matter taught
- Characteristics of the schools where beginning teachers start their career (e.g., school size and locale, school type (charter), unduplicated pupil count, degree of chronic absenteeism, student

[1] For this study, we define our sample of beginning teachers as educators observed for the first time in the state administrative data, who are actively employed (FTE > 0) in K–12 schools on preliminary credentials (student teaching, intern, out-of-state) or emergency waivers, excluding fully cleared and non-instructional staff.

suspension rates, per pupil spending, average level of teacher experience in the school, and average level of teacher turnover in the school).

## Methods

To answer our first three research questions, we use descriptive statistics to examine 1) the numbers and proportions of beginning California teachers entering through different pathways between 2014-15 and 2024-25; 2) the gender, racial/ethnic distributions, and age of the teachers entering through these pathways; and 3) the characteristics of the schools and students where new teachers first teach.

To address our fourth and fifth research questions, we examined beginning teachers' early career mobility and attrition using two multinomial logit approaches that align with the structure of the data. Throughout this paper, we distinguish among three related but conceptually distinct outcomes. **Mobility** (or moving) refers to teachers moving from their initial school to another public school within California. **Attrition** (or leaving) refers to teachers leaving California public K–12 teaching, whether by leaving the profession, moving to private schools, or leaving the state. **Turnover** is used as an umbrella term that encompasses both mobility and attrition. We adopt these distinctions to clarify the different ways early-career teachers move within or exit the workforce, and we use this terminology consistently across descriptive and model-based analyses.

First, to describe one-year retention and transition patterns, we estimated multinomial logit models on entry-year observations only, where the outcome captures next-year status following the first year of teaching (i.e., teaching in the same school, teaching in a different school, not teaching in a public K-12 school in California). We restricted the analytic sample to cohorts from 2017-18 to 2024-25 to ensure a consistent set of data and retained only records for the teacher's entry year. The dependent variable was a three-category outcome with stayers as the base outcome and two alternative outcomes indicating a move to a different school or leaving public K-12 teaching in California in the subsequent year. We estimated three specifications, reporting results as relative risk ratios (RRR): (1) pathway indicators (with student teaching pathway omitted) plus cohort fixed effects; (2) adding teacher characteristics (gender, race/ethnicity, age and age$^2$, highest degree); and (3) additionally adding school

context at entry (teaching assignment/credential group, school level, locale, charter status, unduplicated pupil count (UPC) quartile, chronic absenteeism rate, suspension rate). RRRs are exponentiated coefficients from the model and can be interpreted as multiplicative differences in the relative risk of the outcome versus the baseline outcome, holding other covariates constant. An RRR less than one indicates a lower relative risk of the outcome compared to the reference group, an RRR equal to one indicates no difference in relative risk, and an RRR greater than one indicates a higher relative risk of the outcome, holding other variables constant. Standard errors were clustered at the school level to account for within-school correlation in outcomes.

Second, to characterize five-year turnover dynamics and distinguish mobility from leaving as competing risks over time, we estimated a discrete-time competing-risks hazard model, implemented as a multinomial logit on a teacher-by-year (long) dataset. We restricted the sample to entry cohorts 2017-18 to 2019-20 so that each cohort contributed up to five years of follow-up. For each teacher year (t=1,…,5), we defined a three-category outcome (y): 0 = no event (i.e., still teaching in their first school placement), 1 = first move to another school, 2 = first exit from public K-12 teaching in California. To maintain a proper risk set, teachers were coded as experiencing an event only in the year of their first observed move/leave, and all teacher-year observations after the first event were dropped; teachers without an event by year 5 were treated as right-censored at the end of follow-up. We modeled the discrete hazard

$$P(No\ Prior\ Event), \quad k \in \{0 = Stayer, 1 = Move, 2 = Leave\}$$

using mlogit in STATA with no event (0) as the base outcome, a flexible baseline hazard captured by time indicators, and a time × pathway interaction to allow pathway differences to vary across years since entry (full equation in appendix). As in the one-year models, the focal predictor was entry pathway (reference: student teaching pathway), and we included cohort fixed effects, estimating the same three specifications (unadjusted; adjusted for teacher characteristics; adjusted for teacher and school covariates). Standard errors were clustered at the teacher level to account for repeated observations within teachers over time and at the school level to address unobserved homogeneity within schools. We summarized model-implied hazards using marginal predicted probabilities of moving and leaving at each year since entry. To translate period-specific hazards into cumulative

trajectories, we used fitted probabilities of no event, move, and leave ($P_{0it}$ (no event), $P_{1it}$(move), $P_{2it}$(leave)) to construct the implied survival function and cause-specific cumulative incidence functions (CIFs) over time, and then averaged these quantities by pathway and year to produce standardized survival and CIF curves for comparison across pathways.

The pathway differences in mobility and retention reported in this paper should be interpreted as descriptive associations rather than causal effects of preparation routes themselves. Teachers who enter through student teaching, intern, emergency permit, and out-of-state pathways likely differ along dimensions that are not fully captured in administrative data, such as career intentions, geographic flexibility, family or individual financial resources, prior work experience, or alternative labor market opportunities. Although our models adjust for teacher characteristics, credential areas, and school context variables, unobserved selection into pathways may contribute to observed differences in outcomes. Importantly, acknowledging selection does not diminish the policy relevance of our findings. Entry pathways are the mechanisms through which individuals enter the workforce, and differences in retention across pathways remain highly consequential for workforce stability, equity, and staffing in high-need schools.

# Results

## Trends in Beginning Teacher Employment by Entry Pathways

The number of beginning teachers entering with a preliminary credential through a student teaching pathway steadily declined from 2014-15 to 2019-2020, from 10,105 (63.5%) to 6,823 (43.5%). Although there was a significant increase during the COVID-19 pandemic—likely due to the flexibilities of passage requirements for the Reading Instruction Competence Assessment (RICA) and the Teacher Performance Assessments (TPA)—the number of beginning teachers with a preliminary credential has dropped below pre-COVID levels (5,703 or 39.4% in 2024-25).

The percentage of beginning teachers on intern credentials—who are learning to teach while managing their own classrooms as paid teachers of record—has remained consistent over the past decade, between 13 and 17%, or roughly 1,900 to 2,500 teachers each year. Although California Institutions of

Higher Education (IHEs) still lead in numbers, the "university intern" pathway decreased by 3 percentage points in the last five years, with some of that share shifting to “district intern” programs operated by Local Education Agencies (county offices of education and school districts) (CTC, April 2025).

Teachers prepared and/or licensed in other states can earn a 5-year Preliminary Credential by verifying they hold a bachelor’s degree, have completed a teacher preparation program that includes student teaching, and possess a comparable, valid out-of-state professional license. Applicants must also pass a background check and provide documentation of experience or program completion (CTC, n.d., a-c). The number of beginning teachers who received a preliminary credential through preparation outside California has fluctuated over the past decade, ranging from a high of 2,259 (14.4%) in 2017 to a low of 1,170 (10.5%) during the COVID-19 pandemic. In 2024-25, 1,118 (11.9%) beginning teachers were trained in another state or country. Immigration restrictions and H-1B visa costs are likely to decrease the share of beginning CA teachers trained abroad. However, the overall number of beginning CA teachers with foreign preparation remains relatively small (i.e., 287 H-1B work visas were granted in 2023-24, according to CDE, 2024).

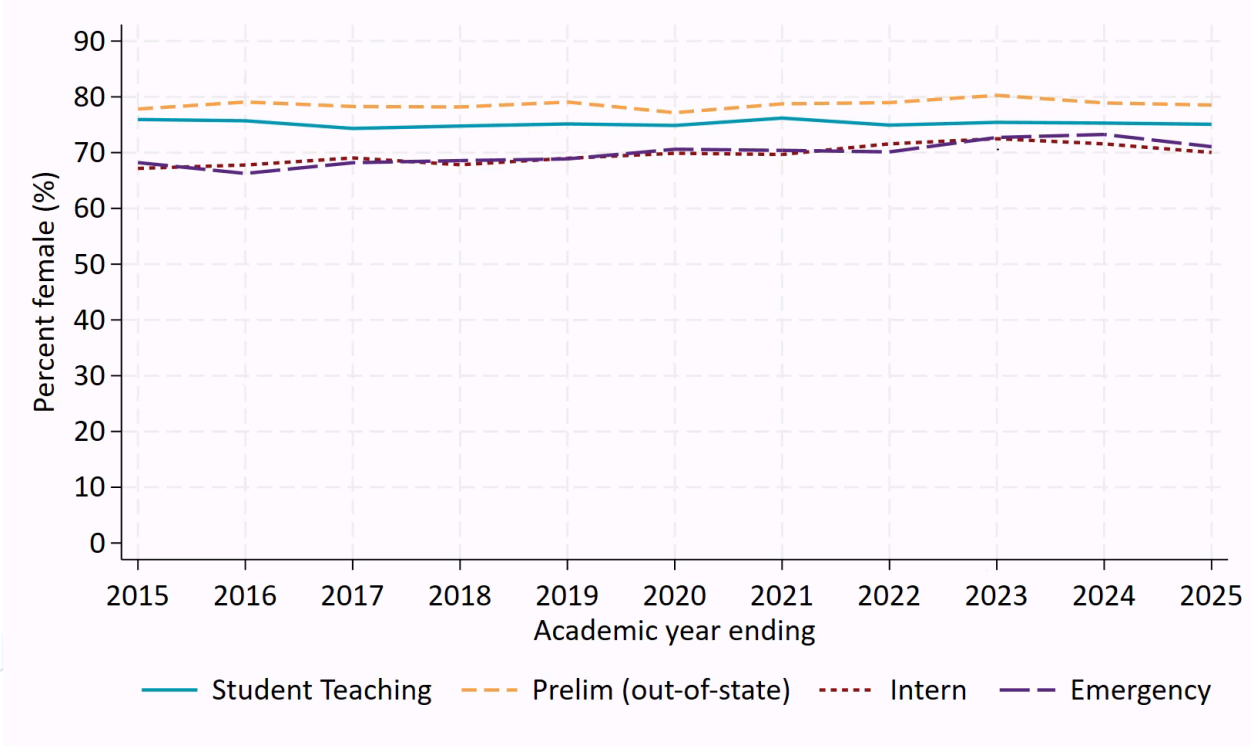
The proportion of teachers who began teaching on an emergency permit has grown from 10% to 30% over the last ten years, indicating a notable increase in demand for teachers that the state does not view as fully qualified to teach (Figure 2). Part of this rise in demand may be due to higher teacher retirement rates. In California, teacher retirements have risen significantly over the past decade, with the total number of retirees and beneficiaries receiving benefits increasing by 17.7% (from about 288,000 to 339,000 as of 2025) (CALSTRS, 2025), and projections indicating a continued growth in annual retirements over the next 5–10 years (CALSTRS, 2024).

Changes in how teachers enter the profession are also closely linked to who enters the workforce. We therefore next examine the demographic composition of beginning teachers across entry pathways, focusing on differences by race/ethnicity, gender, and age, and how these patterns have evolved alongside shifts in the teacher pipeline.

## Demographics of Beginning Teachers

Women continue to dominate the ranks of beginning teachers across pathways, with about 70% of interns and emergency-permitted teachers, 75% of teachers entering through student teaching pathways, and roughly 80% of new teachers from out of state being female. The share of female interns and emergency-permitted teachers has increased over the last decade, although it has begun to fall over the past few years (Figure 3). Although these patterns are influenced by long-standing historical, cultural, and economic factors (CDE, 2022), they suggest that the California teacher workforce will likely remain primarily female.

**Figure 3.** *Percent of beginning teachers who are female by entry pathways: 2014-25 to 2014-25*



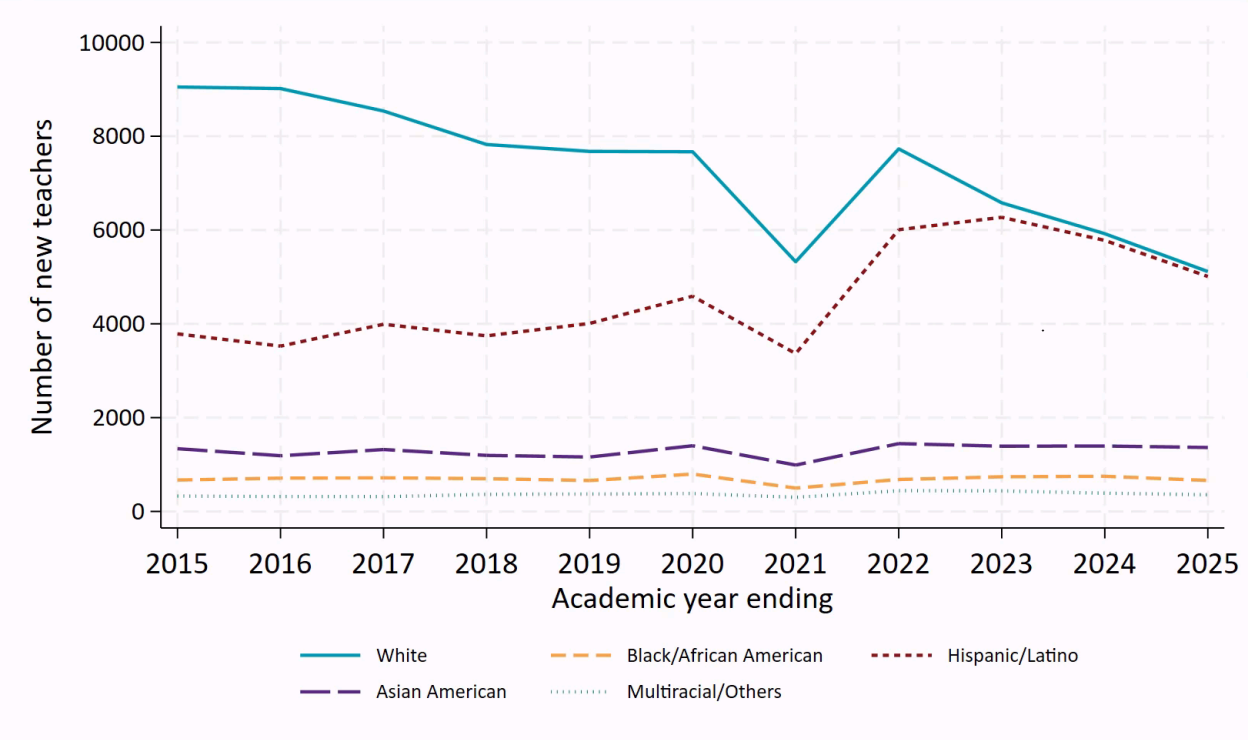
While beginning teachers are still more than twice as likely to identify as White as K-12 students, we have seen increases in racial and ethnic diversity among new teachers (Table 1). Over the past decade, the percentage of new teachers identifying as Hispanic or Latino has almost doubled from 25% to 42% (Figure 4). This is a significant change, especially considering the current California teacher workforce is only 26.2% Hispanic or Latino. Meanwhile, the percentage of beginning teachers who are White has dropped from 60% to 40%, which is much lower than the current 54.2% of White classroom teachers in California. The numbers and proportion of Asian American and Black/African American beginning teachers have stayed steady at 8-11% and 4.5-5.5%, respectively, levels higher than their current representation in the overall teacher workforce (6.3% Asian American and 3.5% Black/African American).

**Table 1.** *Race/ethnicity of California students, teachers, and first-time teachers: 2024-25*

| Race/Ethnicity | CA Students | CA Teachers | Beginning Teachers |
|---|---|---|---|
| **Hispanic/Latino** | 56.1% | 26.2% | 40.1% |
| **White** | 20.0% | 54.2% | 40.9% |
| **Asian American** | 12.3% | 6.3% | 10.9% |
| **Black/African American** | 4.9% | 3.5% | 5.3% |
| **Two or More / Other** | 6.7% | 8.4% | 2.9% |

Note: because of small sample sizes for some racial and ethnic groups of beginning teachers, we are only reporting data separately for the four largest groups.

**Figure 4.** *Number of beginning teachers by race/ethnicity: 2014-15 to 2024-25*

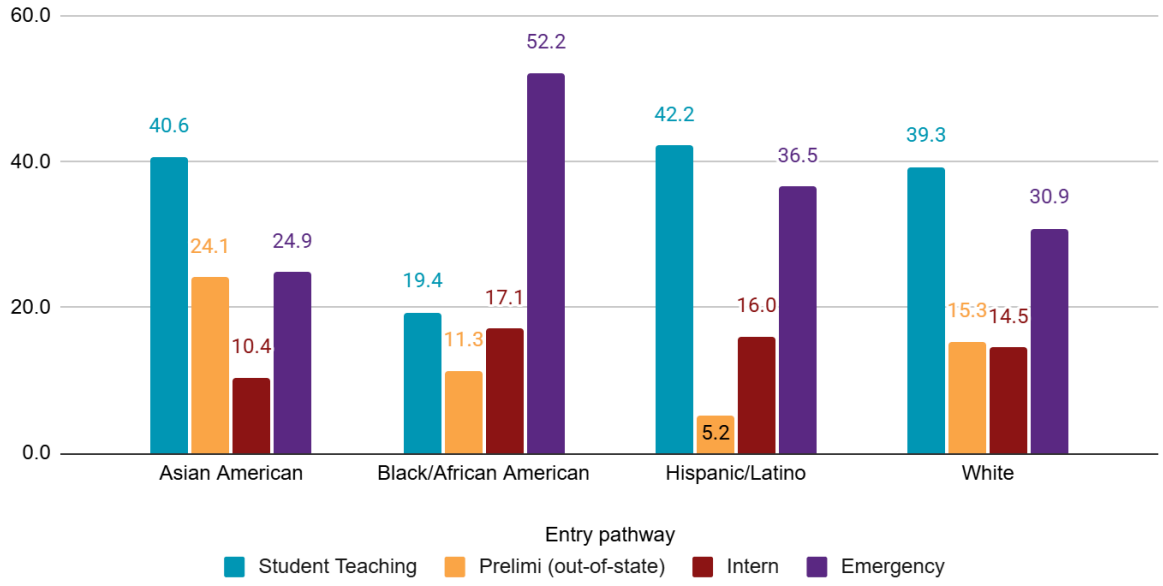


## Racial/Ethnic Difference Across Pathways

The proportion of beginning teachers with a preliminary credential has decreased among all racial and ethnic groups over the past decade, while the share holding an emergency permit has increased. In 2024-25, the largest racial and ethnic difference across pathways was among beginning Black/African American teachers, who were more likely to start their careers on emergency permits (52.2%) than their Hispanic/Latino (36.5%), White (30.9%), or Asian American (24.9%) counterparts (Figure 5).

In 2024-25, beginning Black/African American (17.1%) and Hispanic/Latino (16%) teachers were more likely to start their first teaching job on an intern credential than their White (14.5%) or Asian American (10.4%) counterparts. Beginning Hispanic/Latino teachers (5.2%) were less likely, and Asian American teachers (24.1%) were more likely than their White and Black/African American counterparts to have completed their teacher education out of state (15.3% and 11.3%, respectively).

**Figure 5.** *Percentage distribution of beginning teachers by entry pathways and race/ethnicity: 2024-25*



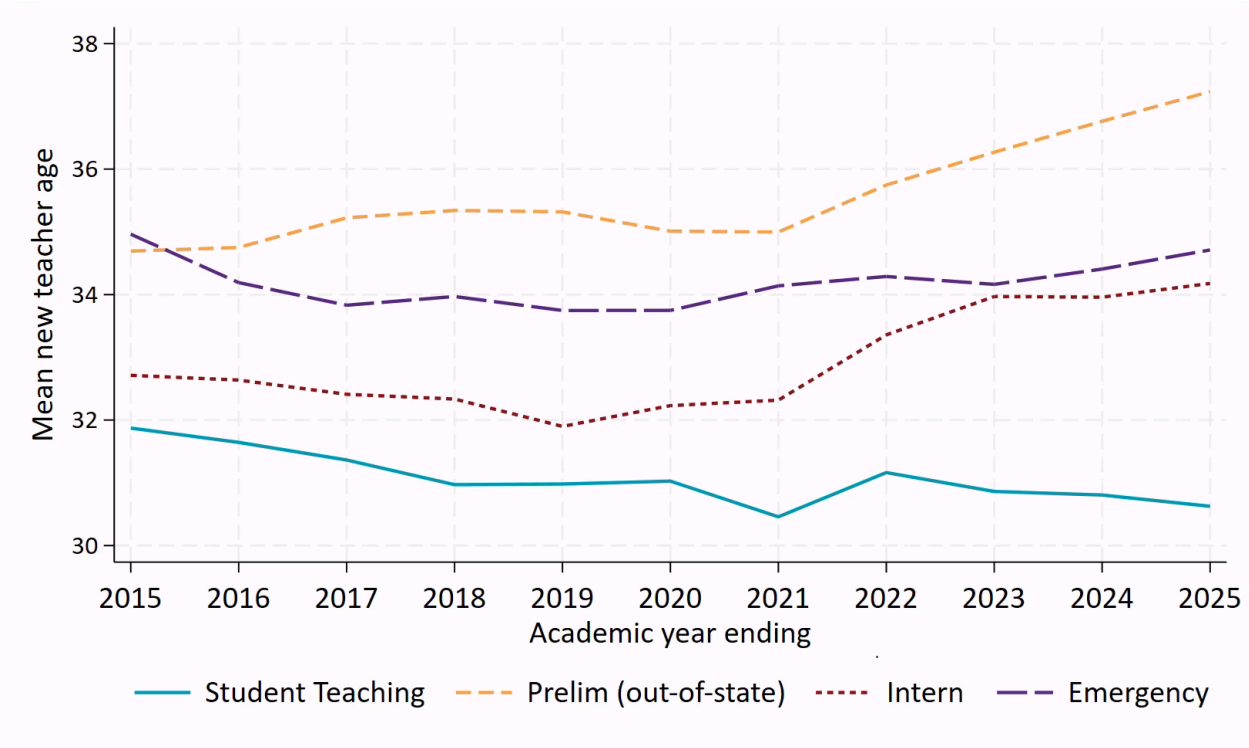

The overrepresentation of teachers of color in alternative, intern, or emergency permit pathways is driven by well-documented structural and financial barriers in traditional teacher preparation (Carver-Thomas, 2018). Financially, traditional preliminary pathways typically require a period of unpaid student teaching. This presents a substantial opportunity cost and financial hurdle that

disproportionately affects low-income candidates and candidates of color, making pathways that offer an immediate salary much more viable (Putman et al., 2016). Furthermore, candidates of color frequently face barriers related to standardized certification testing. Historically, traditional licensure exams have exhibited racial disparities in pass rates, which researchers often attribute to systemic educational inequities and culturally biased test designs (Cowan et al., 2020; Goldhaber & Hansen, 2010). Consequently, many candidates of color enter the profession through alternative or emergency pathways that allow them to bypass or delay these traditional hurdles while serving as the teacher of record.

## Age of Beginning Teachers

Beginning teachers in California tend to be older than those in most other states. According to nationally representative data from the National Center for Education Statistics, in 2011-12 (the most recent year with available state-level data), 74.9% of beginning teachers in the US were 30 or younger, while in California, 63% were 30 or younger. The average age of beginning teachers in California in 2024-25 has surpassed 30 across all entry pathways, with the ages of preliminary credential holders from out of state (37.2) and interns (34.2) increasing since 2021 (Figure 6). The dominance of the "fifth-year" credential model, a high percentage of career changes, and the high cost of living for young people may partly explain the higher average age of beginning teachers in California.

**Figure 6**. *Average age of beginning teachers by entry pathways: 2014-15 to 2024-25*




## Trends in new teachers by credential area and pathway

While the share of preliminary credentials earned through student-teaching pathways has decreased over the past decade across multiple-subject, single-subject, and education specialist (special education) authorizations (Figures 7-9), the largest decline occurred in multiple subjects, dropping from 72.8% in 2015 to 45% in 2025. After COVID-19, the number of beginning teachers on emergency permits has increased in each of these credential areas, and the proportion of teachers entering through the student teaching pathway has declined. The number of beginning teachers starting their career with intern credentials has been relatively stable across multiple subjects, single subjects, and education specialist authorizations.

Education specialist (special education) remains the authorization area with the largest share of teachers who are less than fully prepared. In 2025, 50.5% of new teachers with education specialist credentials held emergency permits, and 23.8% were serving as interns (Figure 10). Just over a quarter

were fully prepared to teach, with 14.2% on preliminary credentials trained out of state and 11.4% who completed a student teaching pathway in California.

**Figure 7.** *Number of beginning teachers with multiple subject credentials by entry pathways: 2014-15 to 2024-25*

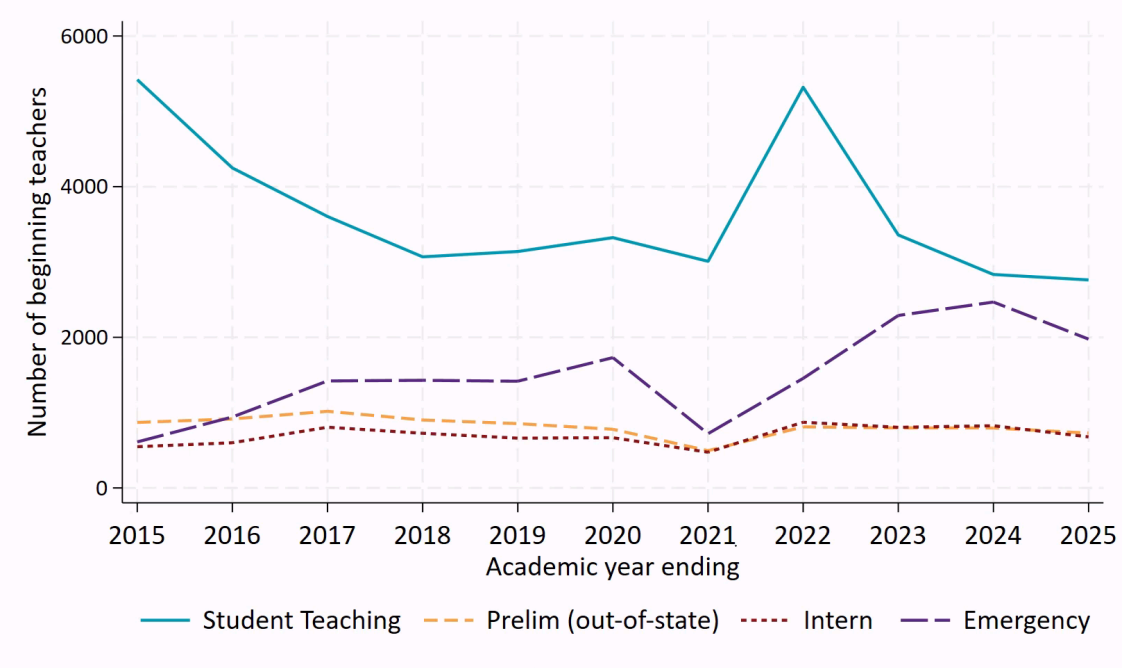


**Figure 8.** *Number of beginning teachers with single subject credentials by entry pathways: 2014-15 to 2024-25*

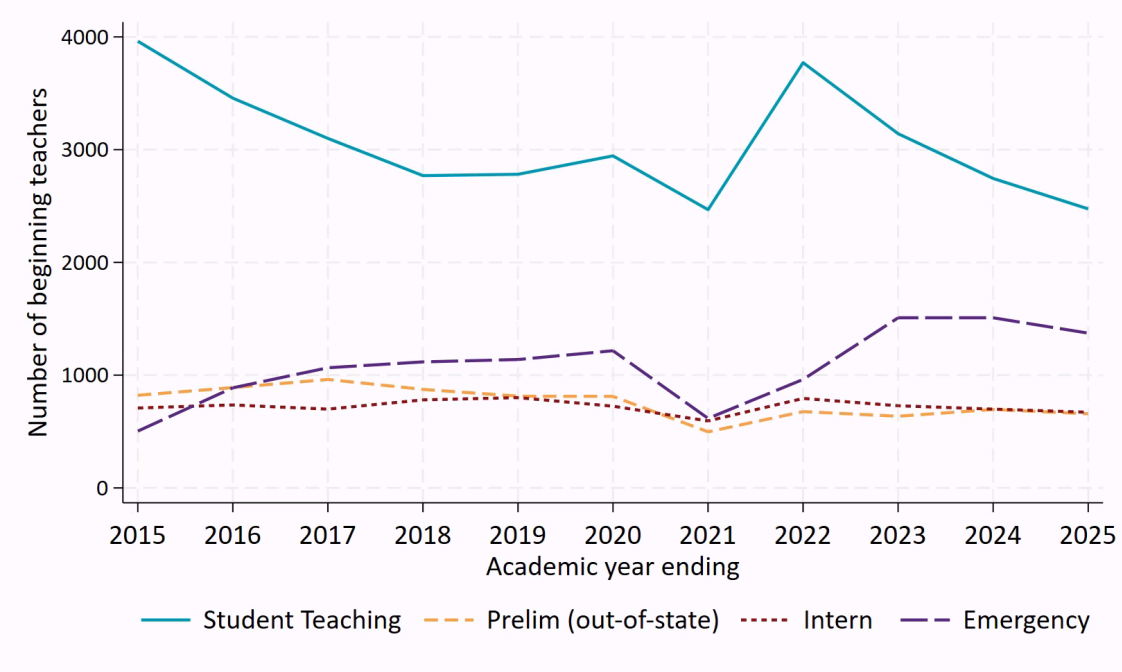



**Figure 9.** *Number of beginning teachers with education specialist credentials by entry pathways: 2014-15 to 2024-25*

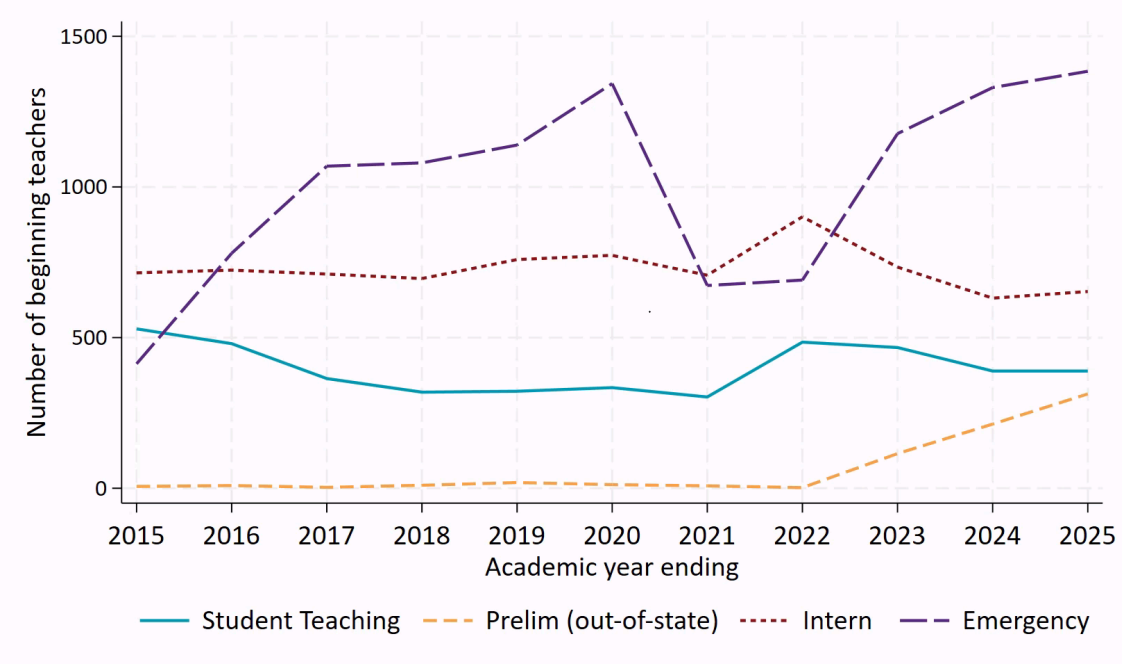
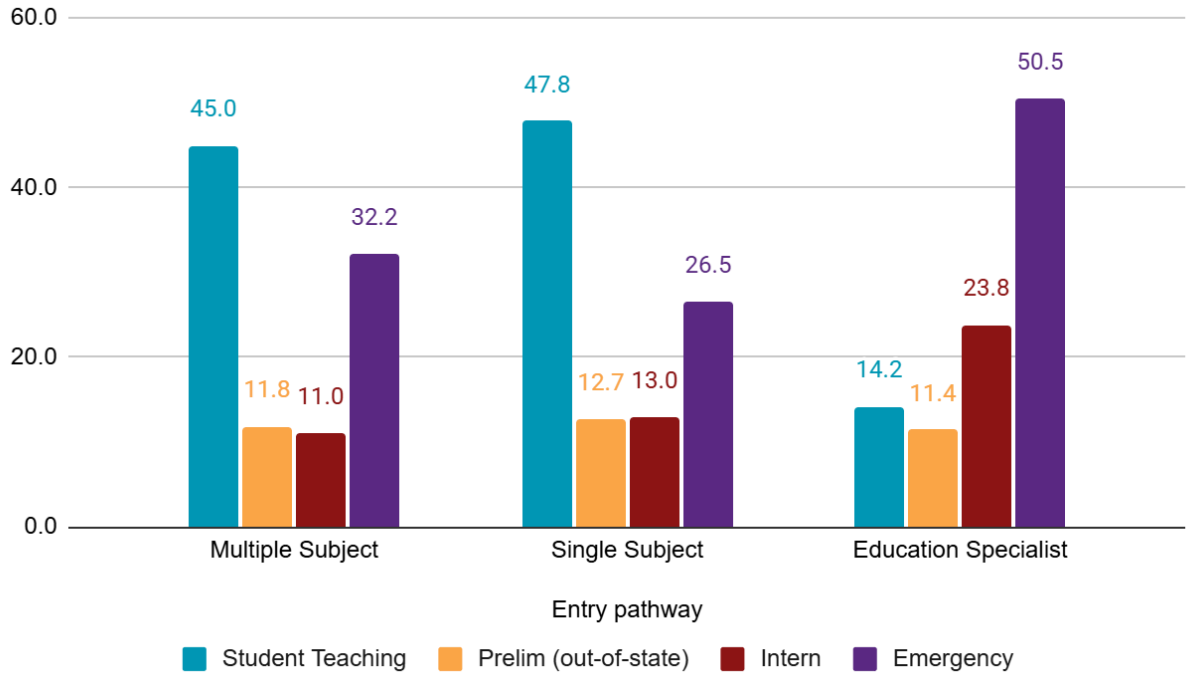
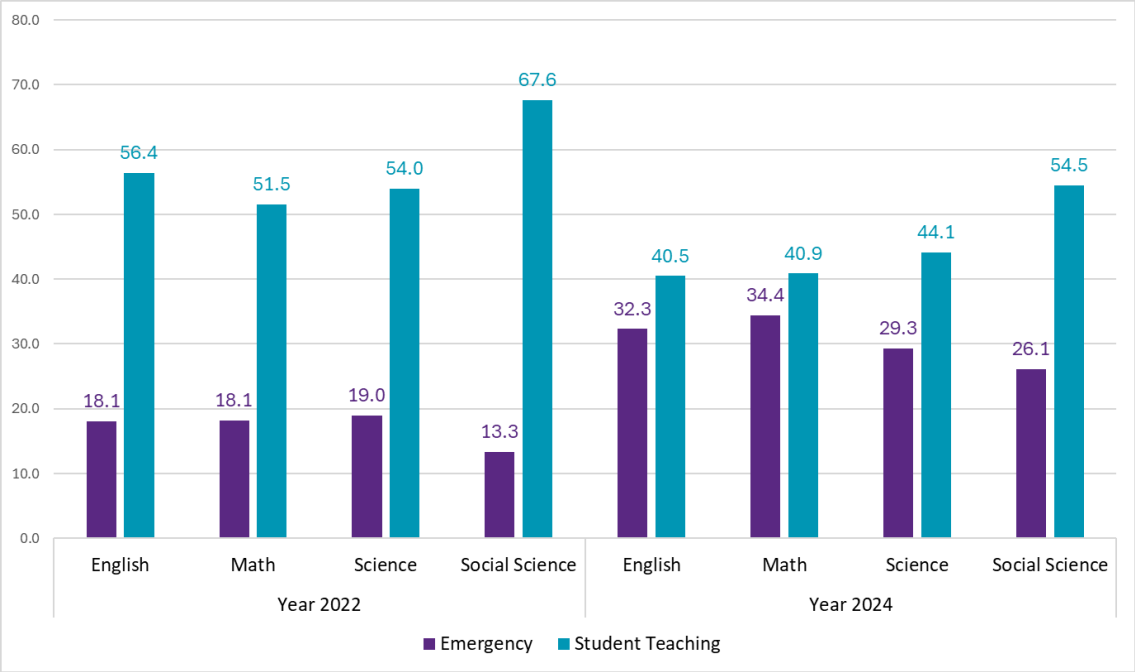


**Figure 10.** *Percentage distribution of beginning teachers by entry pathways and credential areas: 2024-25*




The proportion of beginning teachers with single-subject authorizations teaching in core areas such as English, Mathematics, Science, and Social Studies who entered through the student teaching pathway was lower in 2024 than in 2022, with beginning teachers on emergency permits filling the gap (Figure 11). In 2024, Social Science had the highest percentage of beginning teachers entering through the student-teaching pathway (54.5%), while English (40.5%) and Mathematics (40.9%) had the lowest.

**Figure 11.** *Proportion of beginning teachers with single-subject authorizations by subject taught and entry pathways: 2022 vs. 2024*




Note: The years 2022 and 2024 represent the earliest and most recent data available.

Entry pathways and teacher demographics together shape where teachers begin their careers. Because preparation routes are not randomly distributed across schools, and because teachers from different backgrounds are unevenly represented across pathways, the next section examines the school contexts in which beginning teachers start their careers.

## School Contexts of Initial Placement

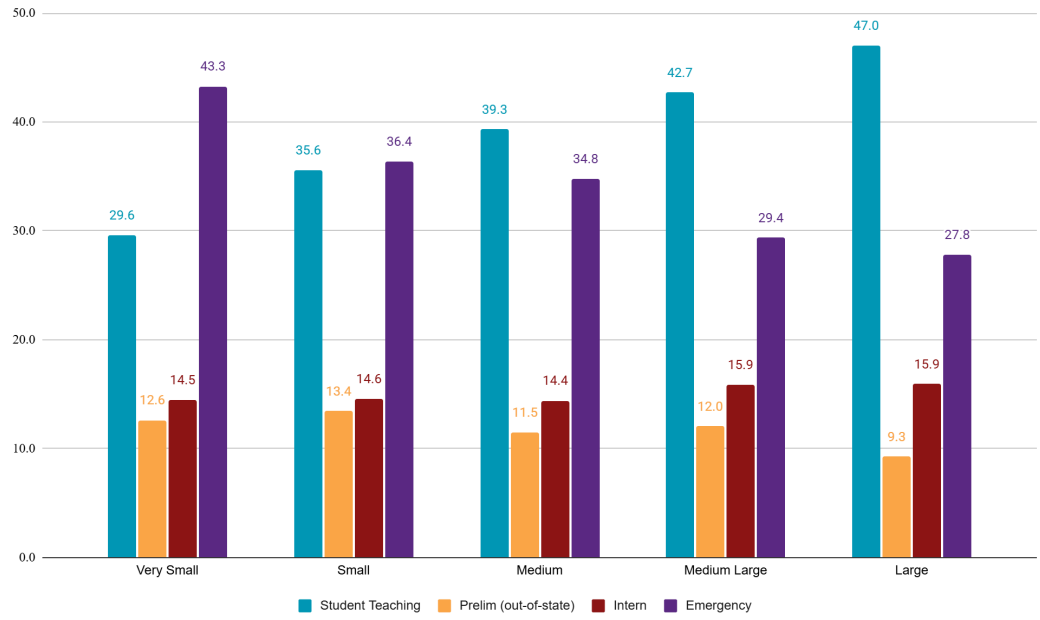
Beginning teachers in California enter schools that differ substantially in organizational conditions, and these differences are systematically related to entry pathways. Teachers hired on emergency permits, intern credentials, and out-of-state preliminary credentials are more likely than their peers entering through student teaching pathways to begin their careers in schools serving higher concentrations of students with greater needs and in organizational contexts marked by higher levels of challenge. These

patterns are consistent across multiple indicators of school context, including student composition, staffing stability, and measures of student engagement and discipline.

**School size[2] and locale.** Very small schools, often located in rural districts, face the greatest challenges in hiring fully qualified beginning teachers. For example, in 2024-2025, very small schools were less likely to have beginning teachers with preliminary credentials earned through a student teaching pathway (30%) compared to medium-sized (43%) and large schools (47%). Smaller schools were also more likely to employ beginning teachers on emergency permits than larger and medium-sized schools. These disparities are likely due to factors such as distance to teacher education programs, lower salaries, and fewer professional development opportunities. Although the expansion of fully online teacher credential programs and professional development has somewhat reduced these barriers, small rural schools still encounter significant difficulties hiring fully trained teachers. Smaller schools often require teachers to cover multiple subject areas, which is harder to staff than specialized roles in larger schools.

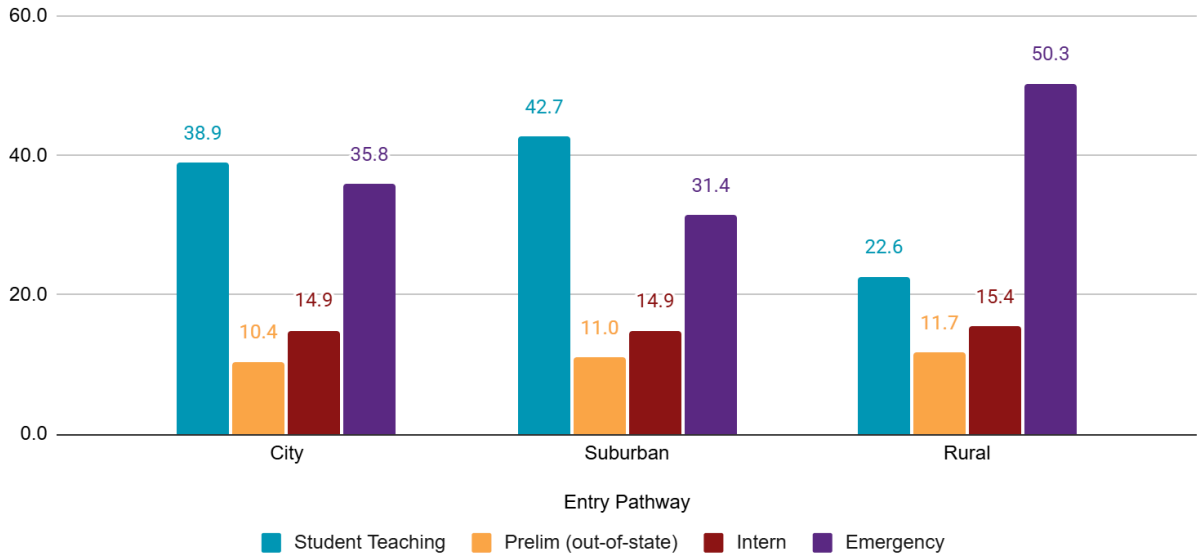
[2] School size is categorized based on the student enrollment numbers: very small is under 150 students, small is 151-400, medium is 401-1000, medium large is 1001-2000, and large is over 2000.

**Figure 12.** *Percentage distribution of beginning teachers by entry pathways and size of the first school placement: 2024-25*




While, on average, city, suburban, and rural schools all employ 30% or more of their beginning teachers with emergency permits, rural schools face the greatest challenge in hiring fully qualified first-time teachers, with 50.3% their beginning teachers hired on emergency permits and only 34.3% hired with a preliminary credential—22.6% trained in state through student teaching programs and 11.7% trained out of state (Figure 13). City, suburban, and rural districts were equally likely to hire beginning teachers as interns (about 15%).

**Figure 13.** *Percentage distribution of beginning teachers by entry pathways and urbanicity of the first school placement: 2024-25*




**School level.** Across all school levels (elementary, middle, and high, see figures 14-16), there was a distinct pandemic-era disruption: a sharp drop in the number of beginning teachers entering with emergency permits in 2021, immediately followed by a temporary, significant spike in teachers entering through the student teaching pathway in 2022. Following this 2022 peak, elementary schools saw the number of beginning teachers entering through a student teaching pathway decline and stabilize, returning roughly to pre-COVID levels by 2024-25. However, the number of emergency permit holders at the elementary level surged after 2021, reaching levels significantly higher than before the pandemic. By 2024, the number of elementary teachers on emergency permits nearly equaled those from student teaching pathways, before both saw a slight dip in 2025.

In contrast, middle and high schools have seen steadily declining numbers of new teachers through student teaching pathways since 2022, dropping noticeably below their pre-COVID baselines by 2025. Additionally, the number of beginning teachers holding emergency permits at the secondary level has been steadily declining since peaking in 2023.

Finally, across all three school levels, the intern and preliminary out-of-state pathways remained the least utilized. These pathways showed relatively flat, stable trends over the nine years, largely unaffected by the severe fluctuations seen in the student teaching and emergency pathways.

**Figure 14.** *Number of beginning teachers teaching at the elementary school level by entry pathways: 2016-17 to 2024-25*

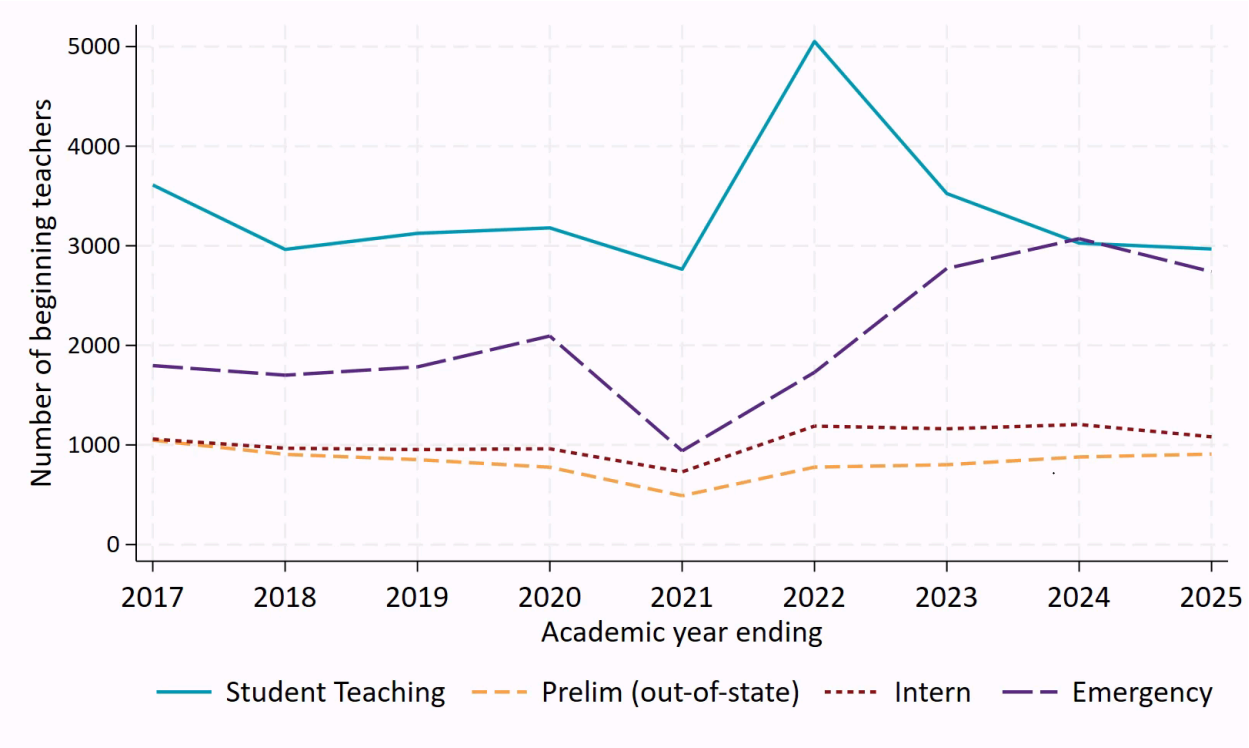


**Figure 15.** *Number of beginning teachers teaching at the middle school level by entry pathways: 2016-17 to 2024-25*

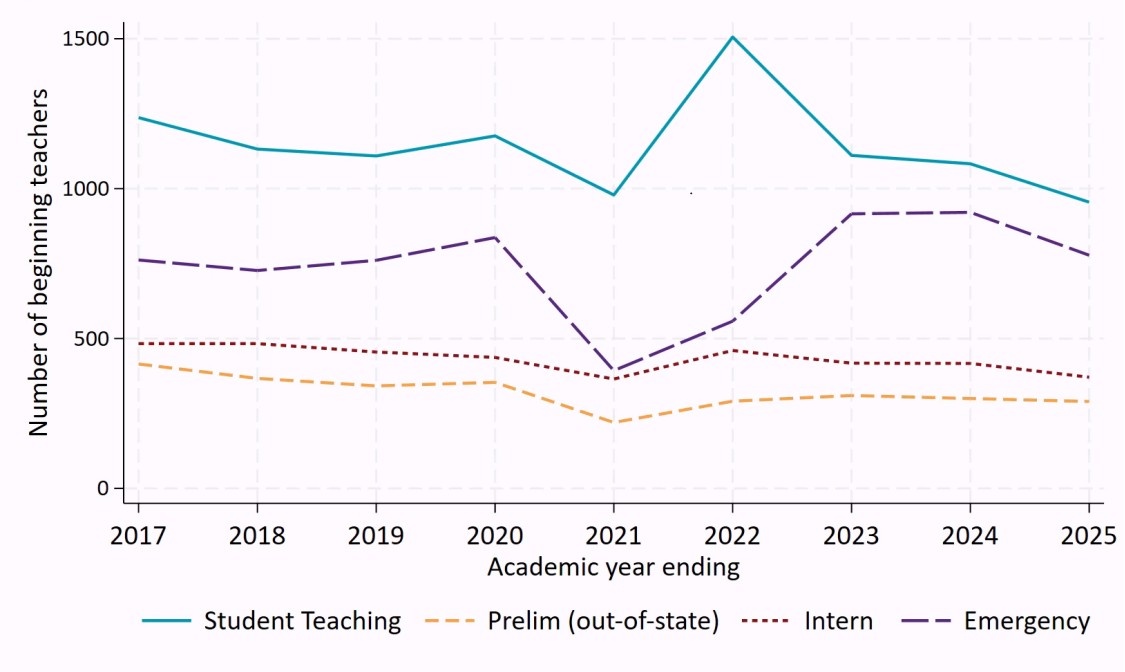
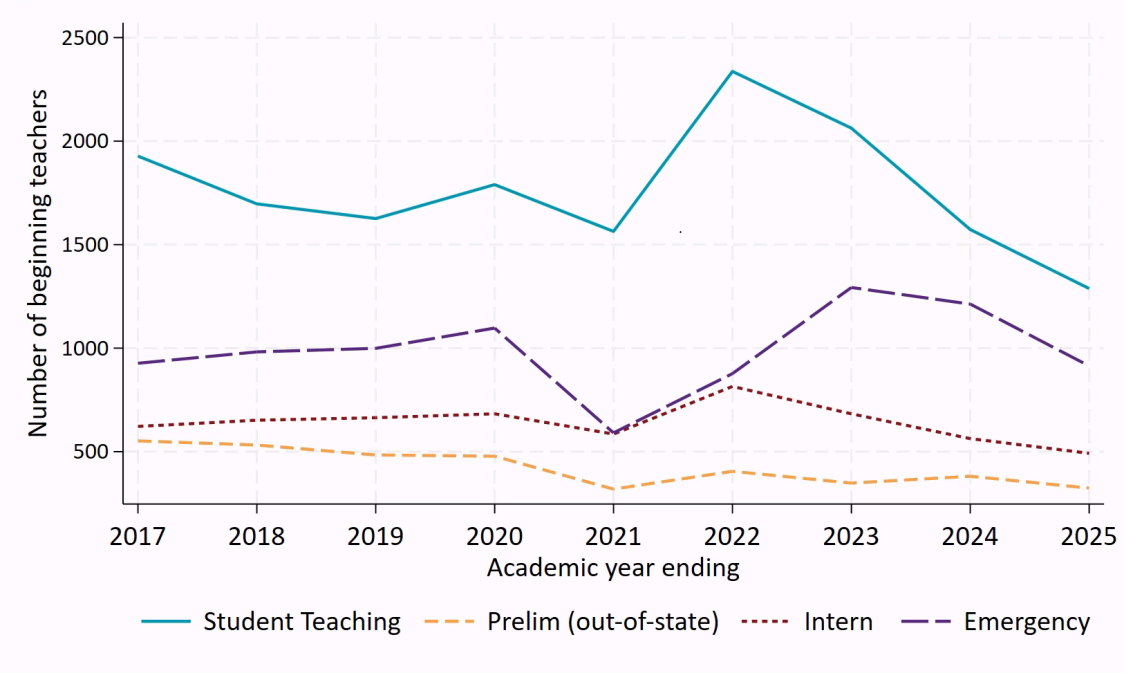


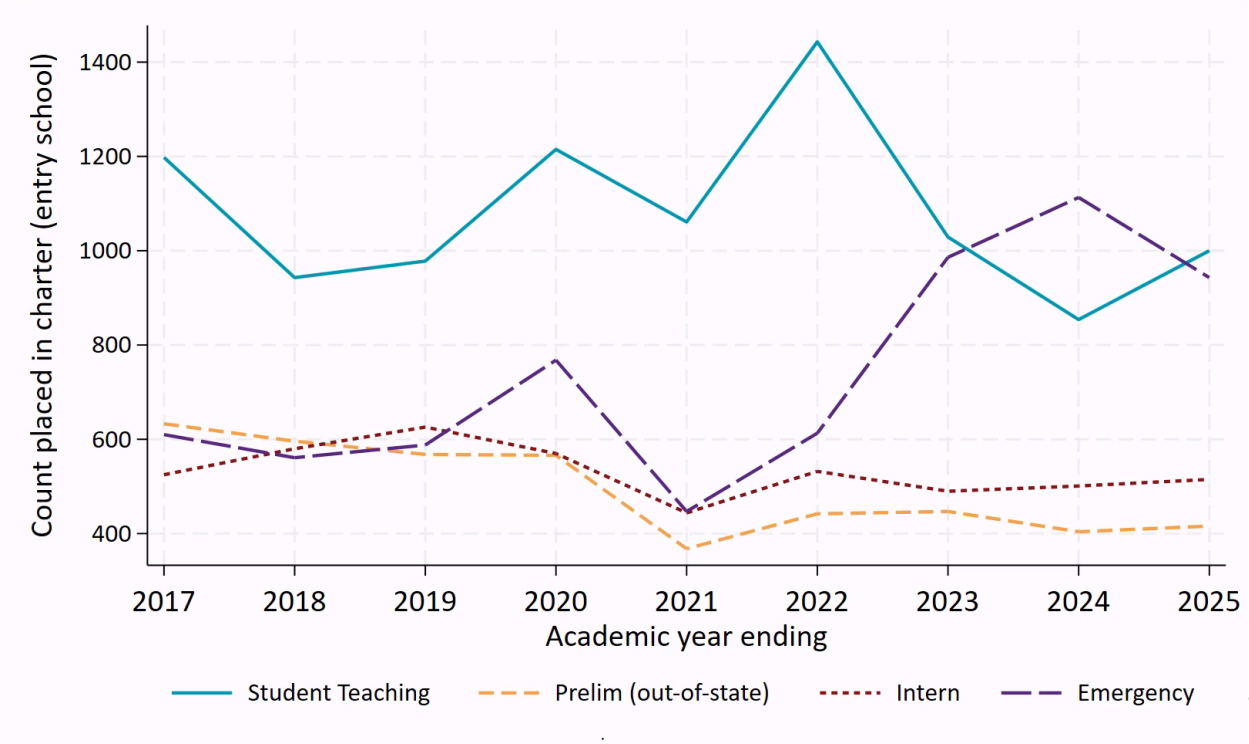

**Figure 16.** *Number of beginning teachers teaching at the high school level by entry pathways: 2016-17 to 2024-25*



**Charter schools.** With the passage of AB 150, new teachers hired into charter schools after 2019-20 have generally been required to hold the same Commission on Teacher Credentialing (CTC) certificate, permit, or equivalent document as teachers in traditional public schools, especially for core subjects (CDE, 2020). Charter school enrollment has grown slowly since the pandemic, while overall public-school enrollment has declined significantly. Charter school enrollment has risen to nearly 728,000 students, accounting for 12.5% of all public-school students across 1,280 campuses and independent study programs (Baron, 2025).

A quarter of beginning out-of-state teachers and a quarter of interns secure their first jobs in charter schools, compared to about 18% of their counterparts entering through student teaching pathways in CA. Charter schools have seen a notable increase in the number of beginning teachers on emergency permits since 2021, although these figures appear to have stabilized (Figure 17).

**Figure 17.** *Number of beginning teachers in charter school at the first placement by entry pathways: 2016-17 to 2024-25*

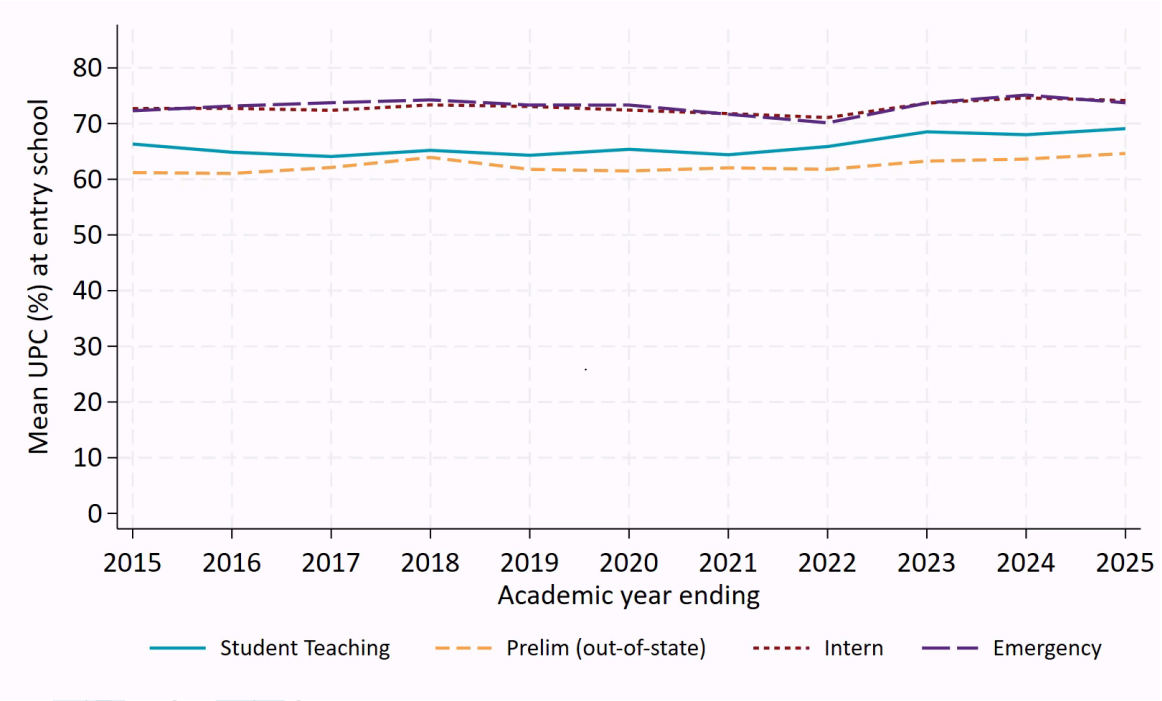


## New Teachers in High-Need Schools

**Unduplicated pupil count.** The Unduplicated Pupil Count (UPC) in California is the total number of distinct K-12 students enrolled in a school district or charter school who are classified as English learners, eligible for free or reduced-price meals (FRPM), or foster youth, with each student counted only once, even if they qualify in multiple categories. Representing "high-need" students, this count drives the Local Control Funding Formula (LCFF) by determining the Unduplicated Pupil Percentage (UPP), which dictates supplemental and concentration grant funding (CDE, 2025).

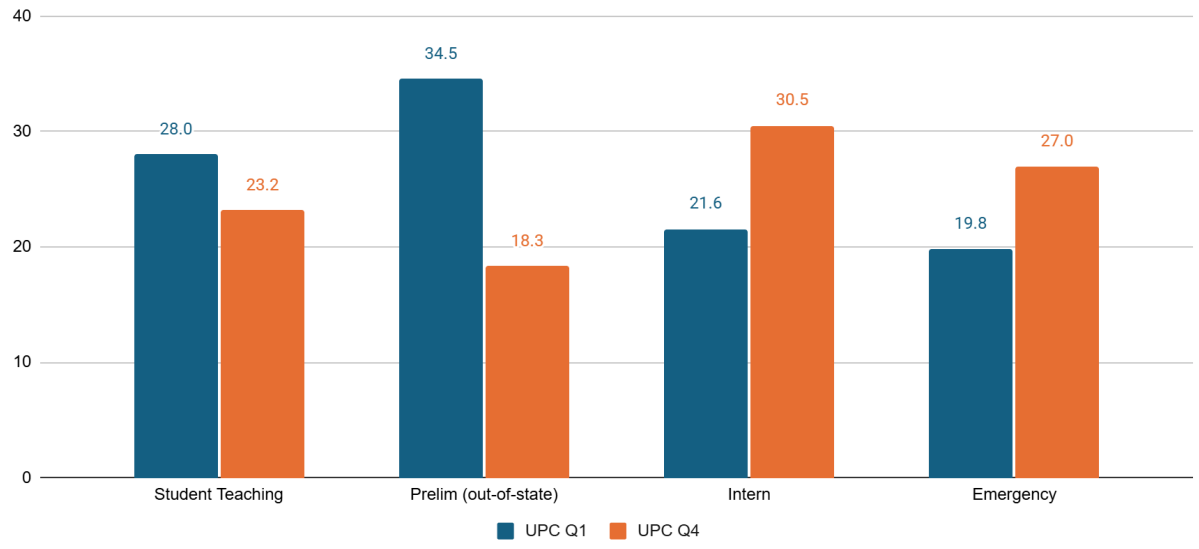
In 2024-25, beginning teachers with intern credentials or emergency certificates had their first teaching job in schools with an average Unduplicated Pupil Count (UPC) of 74%, compared with 69.1% for preliminary credential holders entering from a student-teaching pathway and 74.6% for preliminary credential holders from out of state (Figure 18). The average UPC of school placements for beginning teachers has increased by two to four percent over the last decade, with the largest gains, indicating that beginning teachers are increasingly starting their careers in high-need schools.

**Figure 18.** *Mean UPC (%) at the first school placement of beginning teachers by entry pathways: 2014-15 to 2024-25*



Focusing solely on the average UPC level in the school can hide differences across pathways in the placement of beginning teachers into the highest-need schools. Figure 19 displays the percentage of beginning teachers by entry pathway working in the quarter of schools with the highest need (defined here as the 75$^{th}$ percentile of UPC). In 2024-25, 31% of beginning teachers with intern credentials were teaching in the highest-need schools, compared to 27% of emergency permit holders, 23% of student teaching teachers, and 18% of out-of-state trained preliminary credential holders. On the other hand, over a third of out-of-state-trained preliminary credential holders teach in schools with low UPC levels (up to the 25$^{th}$ percentile), followed by student teaching teachers (28%), intern credential holders (22%), and emergency permit holders (20%).

**Figure 19.** *Percentage of beginning teachers starting at the first school in the first and the fourth quartiles of unduplicated pupil count (UPC) by entry pathways: 2024-25*




Initial placement in high-need schools also varies by the race/ethnicity of the beginning teachers. Beginning Black/African American and Hispanic/Latino teachers holding preliminary credentials were more likely to have their first placement in schools with higher UPC (75.6 and 76.8%, respectively) than their White (61.8%) and Asian American (64.4%) counterparts (Figure 20).

Among beginning teachers with intern credentials and emergency permits, Black/African American and Hispanic/Latino teachers were much more likely than their White and Asian American counterparts to serve in schools with a high UPC (Figure 21). For example, among those who started teaching on an emergency credential in 2024-25, the percentage of teachers whose school is in the highest quartile of UPC at their first placement was 26% for Black/African American teachers, 30% for Hispanic/Latino teachers, 14% for Asian American teachers, and 13% for White teachers. Patterns are similar for teachers who started on a preliminary credential and were student teaching, with 36% of Black/African American and 36% of Hispanic/Latino teachers' first schools in the highest UPC quartile, compared to 20% of Asian American and 15% of White teachers.

**Figure 20.** *Unduplicated pupil count (UPC) percentage in the first school placement of beginning teachers by entry pathways and race/ethnicity: 2024-25*

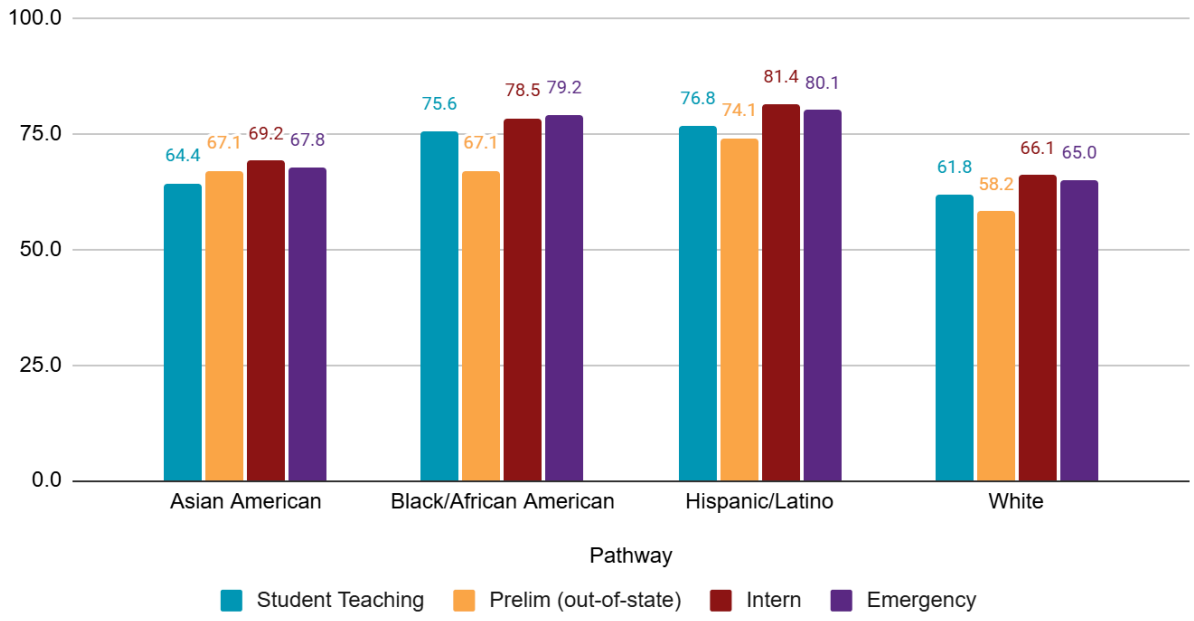
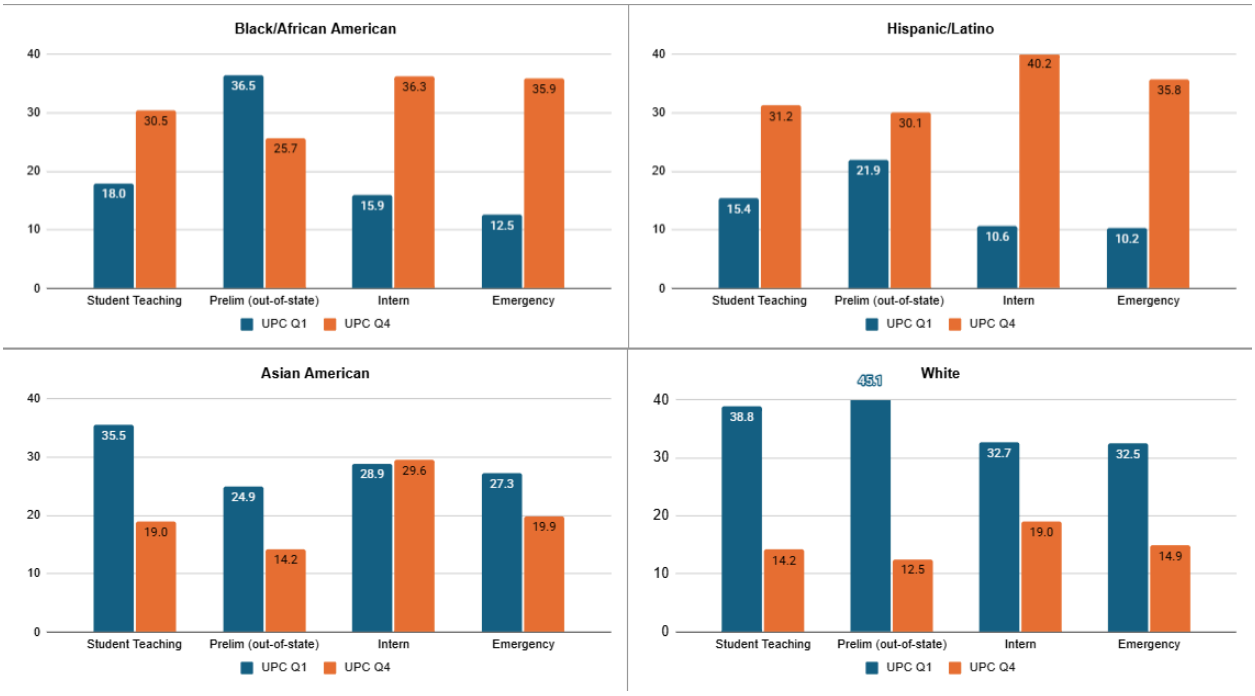


**Figure 21.** *Percentage of teachers whose first school is in the first or the fourth quartiles of unduplicated pupil count (UPC) by entry pathways and race/ethnicity: 2024-25*




To understand how entry pathways translate into different early-career experiences, we examine a set of school-level indicators that capture organizational conditions faced by beginning teachers. Rather than providing a comprehensive assessment of these conditions statewide, we focus on differences across entry pathways in the environments where teachers begin teaching.

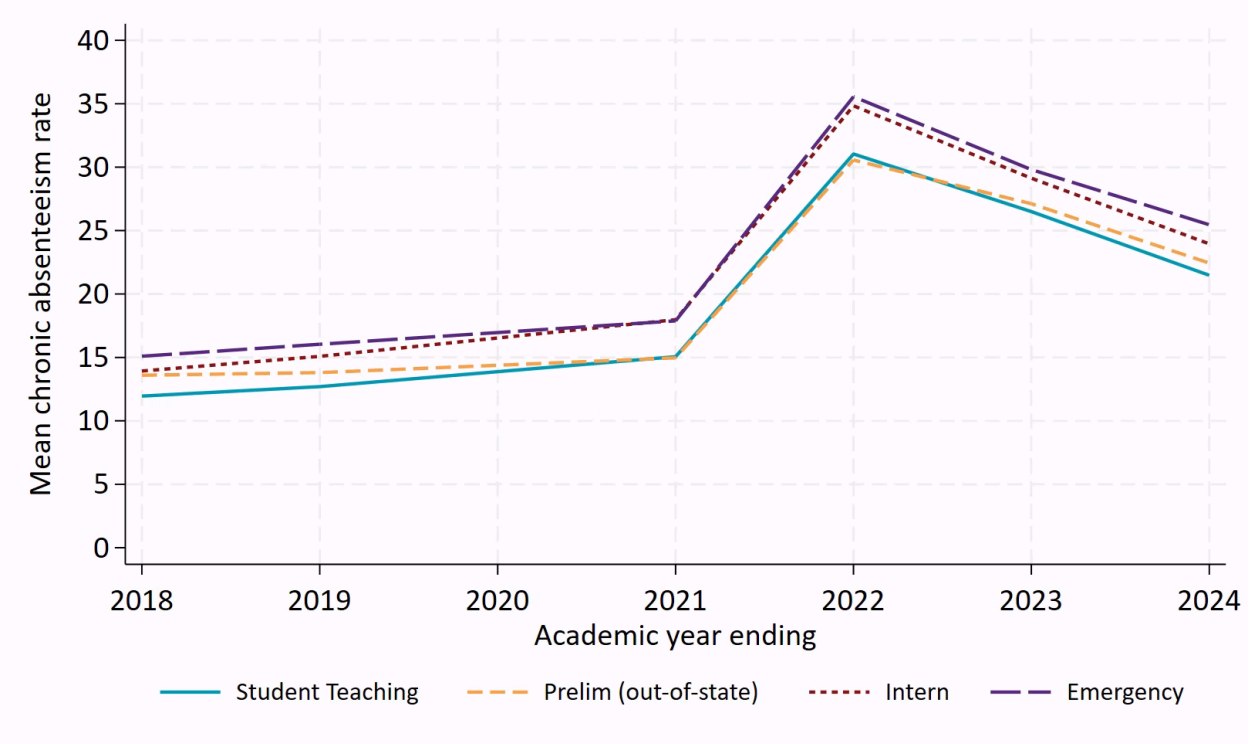
## Student Chronic Absenteeism in First School Teaching

One indicator of organizational challenge is chronic absenteeism, which varies meaningfully across the schools where teachers from different pathways begin teaching. Beginning teachers entering through emergency permits and intern pathways are disproportionately placed in schools with higher rates of chronic absenteeism, compared to those entering through student teaching pathways. Rather than reflecting individual teacher characteristics, these differences primarily capture features of the instructional and organizational environment into which teachers are hired. Schools with higher absenteeism rates tend to face greater instructional disruption and higher demands on novice teachers,

conditions that prior research has linked to increased stress, reduced instructional support, and higher early-career attrition.

Like most teachers, beginning teachers faced high levels of chronic absenteeism in their schools after the COVID-19 pandemic. Interns and emergency permit holders were hired into schools with an average chronic absenteeism rate of about 35% in 2021-2022, while preliminary credential holders, both from student-teaching and out-of-state pathways, had rates about 5 percentage points lower (Figure 22). The rates of chronic absenteeism that beginning teachers encountered after COVID have decreased somewhat but remain higher than pre-pandemic levels.

**Figure 22.** *Mean chronic absenteeism rate of the first school placement of beginning teachers by entry pathways: 2017-18 to 2023-24*

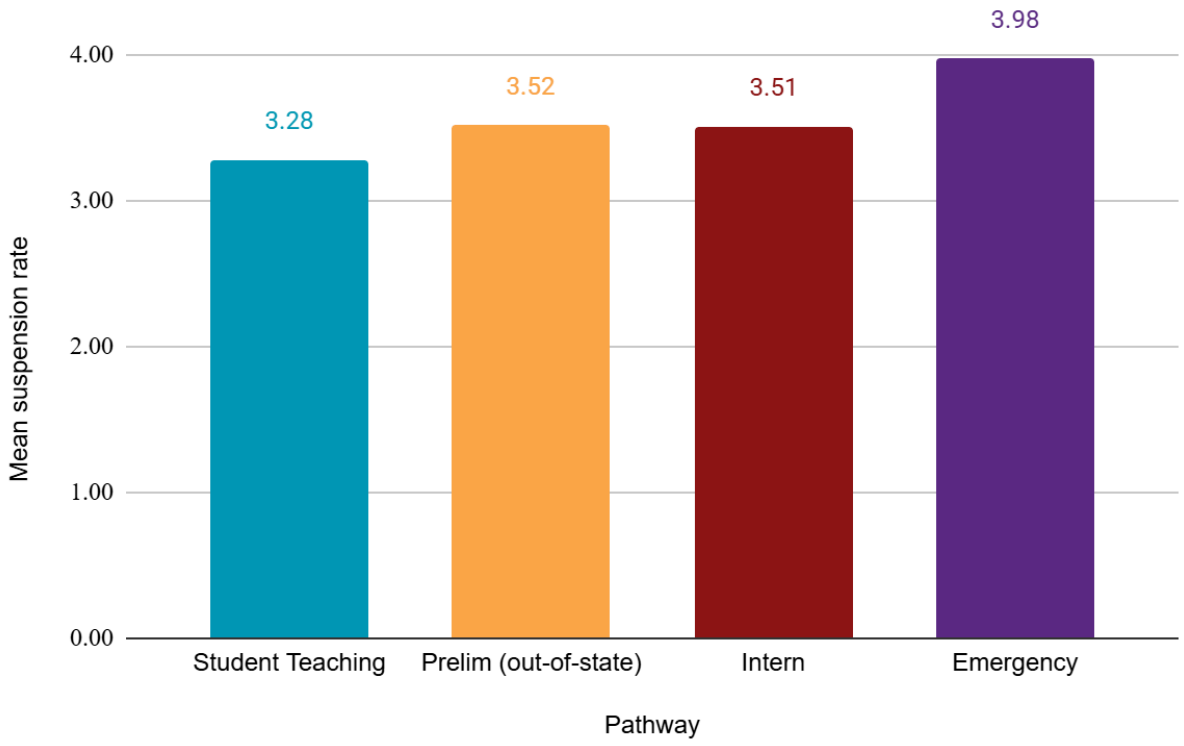


## Suspension Rate in First School Teaching

Similar patterns emerge for student suspension rates. Schools employing higher shares of emergency-permit and intern teachers exhibit modestly higher suspension rates than schools where teachers entering through student teaching pathways are more prevalent. While suspension rates are only one dimension of school climate, they serve as an additional indicator of behavioral and organizational challenges faced by beginning teachers. Placement into schools with elevated suspension rates may increase early-career demands on classroom management and reduce opportunities for instructional support, contributing to differences in mobility and retention observed across pathways (Flores & Losen, 2023; Leung-Gagné, McCombs, Scott, & Losen, 2022).

In 2023-2024, the average suspension rate in schools where beginning teachers were hired ranged from 3.3% for preliminary credential holders entering through student teaching pathways to 4% for emergency permit holders (Figure 23). These school-level suspension rates were slightly lower after the COVID-19 pandemic than before.

**Figure 23.** *Mean suspension rate of the first school placement of beginning teachers by entry pathways: 2023-24*



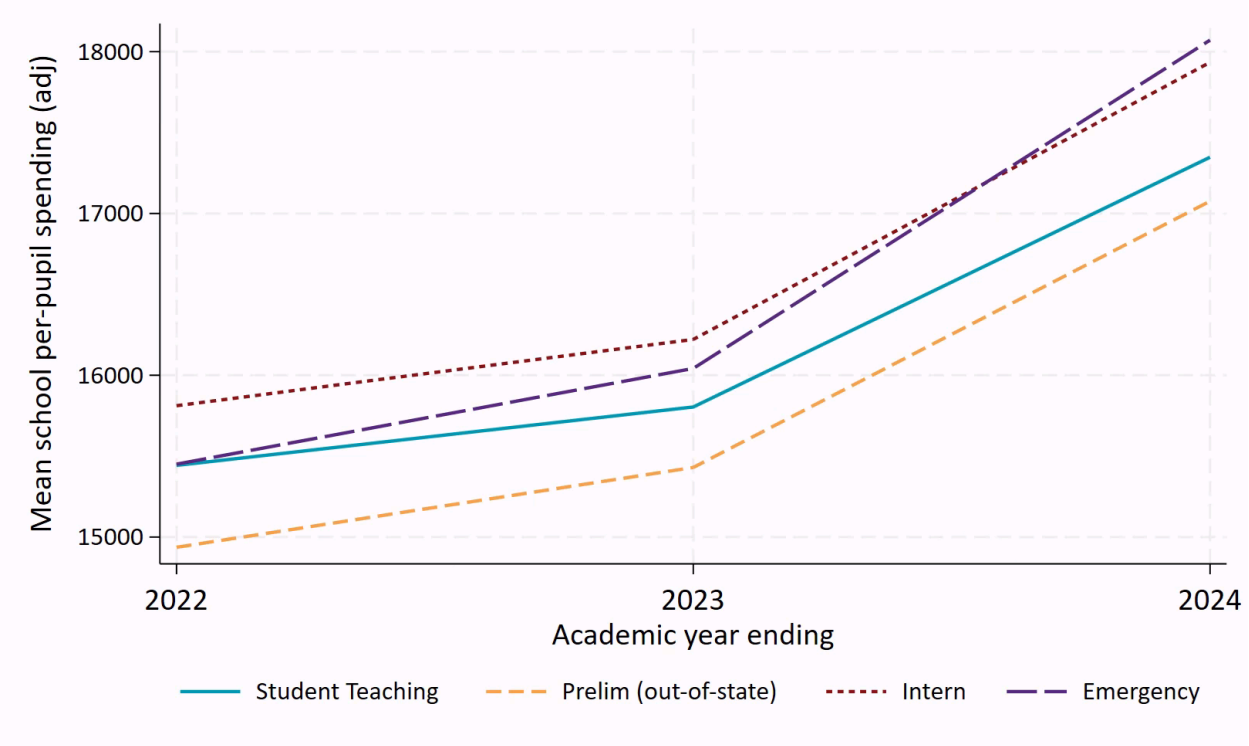

## Per-Pupil Spending in First School Teaching

In 2022–23, California's K–12 spending per pupil was $20,496, roughly $2,800 above the national average. While ranking 16th in the country for per-pupil spending, this drops to 31st once adjusted for cost-of-living differences. Per-student spending has increased significantly since the pandemic, but varies by district type (e.g., $9,239 in elementary districts vs. $10,455 in high school districts) (Lafortune & Guinan, 2025)

Average school per pupil spending (adjusted for inflation) in schools where beginning teachers were hired increased by about $2,000 between 2021-2022 and 2023-2024 (Figure 24). Emergency permit holders and intern teachers were hired into schools with per-pupil spending of about $18,000. New teachers with preliminary credentials worked in schools with about $17,300 per-pupil spending, and their out-of-state counterparts worked in schools with $17,100 per pupil. This makes sense as the Local

Control Funding Formula (LCFF) increases funding for the highest need local education agencies (i.e., districts, charter schools, or county office of education).

**Figure 24.** *Mean school per-pupil spending of the first school placement of beginning teachers by entry pathways: 2021-22 to 2023-24*




## Teacher Salaries in First School Teaching

California teachers have the highest average salary in the U.S., at about $101,084 for the 2023-24 school year, reflecting a 6% increase from the previous year. While salaries vary by district, experience, and education level, the starting salary is roughly $58,409, making it the second-highest nationwide (CDE, nd). While raw starting salaries may appear high, the mean entry-level salary for California teachers falls to roughly $58,000 once adjusted for cost-of-living differences across the state (Leung-Gagné et al., 2026). Although California offers relatively high salaries compared to other states, new teachers still face a "pay penalty," earning roughly 80 cents for every dollar earned by other college-educated professionals with similar experience. This pay gap, which widens considerably over

time, persists despite the high cost of living, as real teacher salaries have stagnated, increasing by just 1-3% since 2004–05 (Allegretto, 2025; Lambert, 2025; Leung-Gagné et al., 2026). Consequently, this financial strain directly impacts workforce stability; research indicates that for every $10,000 increase in entry-level salary, teacher "leaver" rates drop by 8.9% (Leung-Gagné et al., 2026).

Actual starting salaries in specific districts vary greatly, ranging from about $45,000-$50,000 in rural areas to over $65,000 in large urban districts for entry-level jobs. The average inflation-adjusted starting salaries for teachers decreased by approximately $4,000 between 2019-2020 and 2023-2024, returning to just below the 2019-2020 levels by 2023-2024 (NEA, 2025).

Depending on the LEA, the pay scale may be lower for educators teaching on an intern credential, as they may not be considered "fully credentialed." California Education Code Section 44462, part of the Teacher Education Internship Act of 1967, authorizes school districts to reduce an intern's salary by up to 1/8th (12.5%) to pay for supervision, provided the intern is paid at least the minimum base salary for a regularly certificated teacher, and one supervisor handles no more than eight interns.

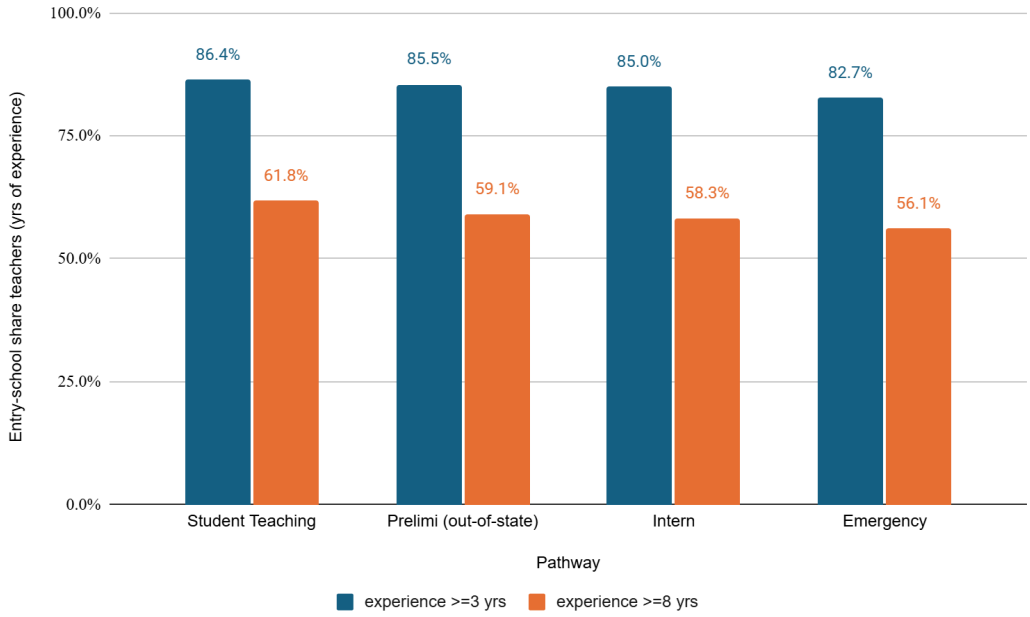
In 2023-2024, beginning teachers from student teaching and intern pathways taught in districts with similar average starting salaries for bachelor's degree plus 30 graduate credit hires (BA+30 teachers) ($58,014 and 57,716, respectively). New teachers on emergency permits worked in districts where BA+30 beginning teachers earned about $1,000 less, and preliminary teachers from out of state worked in districts where the scale for BA+30 was $2,000 lower than the average for student teaching and intern pathways.

## Average Teacher Experience Level in Initial School Teaching

Schools with a high concentration of novice teachers, having a "lower average experience level," may face higher turnover and less stability, which can hinder the development of new, incoming teachers. Without experienced mentors, new teachers might struggle to develop effective classroom management and pedagogical techniques, leading to increased turnover (Carver-Thomas & Darling-Hammond, 2017; Luft, Navy, Wong & Hill, 2022).

We examine the percentage of beginning teachers entering through different pathways who have more experienced teachers in their schools, both where the percentage is three years of experience or more, and eight years of experience or more. Teachers entering from a student-teaching pathway (86%) or intern pathway (85%) were more likely to be initially placed in a school with a larger percentage of teachers with three or more years of experience, on average, than beginning teachers on an emergency permit (83%), although the difference is quite small. Emergency permit holders are less likely to teach in schools where teachers have, on average, eight or more years of experience (56%) than those entering through a student teaching track (62%) (Figure 25).

**Figure 25.** *Percentage of teachers with three or more years vs. eight or more years of experience at the first school placement of beginning teachers by entry pathways: 2024-25*




## Average Level of Teacher Turnover in First School Teaching

High teacher turnover, whether leaving the profession or changing schools, adversely affects new teachers by reducing mentorship opportunities, disrupting the flow of institutional knowledge, and creating chaotic, unsupported workplaces. It often places new educators in roles with increased,

unguided responsibilities, which lowers opportunities for collaborative learning and raises their likelihood of leaving the profession (Carver-Thomas & Darling-Hammond, 2017).

In California, turnover rates among schools where beginning teachers started their careers were similar across different entry pathways. In 2024-2025, beginning teachers entering through a student-teaching pathway worked in schools with a previous year's teacher turnover rate of 12%, compared to 12.3% for interns and 13% for emergency permit holders, with the gap in turnover rates narrowing over the past decade.

These differences in initial school contexts provide essential context for interpreting patterns of early career mobility and attrition. Because organizational conditions such as student need, staffing stability, and disciplinary climate are closely associated with teacher turnover, we next examine how entry pathways and initial placements relate to teachers' likelihood of moving schools or leaving California public K–12 teaching.

## Turnover Rates of Beginning Teachers

Teacher turnover results from a mix of personal, school-level, and systemic factors (Ingersoll, 2001; Nguyen et al., 2020; Smith & Ingersoll, 2004). High turnover rates, whether due to moving schools or leaving teaching entirely, can disrupt instructional continuity and negatively impact student achievement and other outcomes (Ronfeldt, Loeb & Wyckoff, 2013). Administrative data does not reveal why teachers move or leave. Moving can be involuntary, such as when a school's enrollment declines and the most recently hired teachers are transferred to another school in the district. Leaving may be related to dissatisfaction with teaching at a school or pre-tenure release based on performance. Regardless of the reason, high levels of turnover are disruptive to schools and costly to districts. For example, teacher turnover incurs high costs, including expenses related to separation, recruitment, hiring, and training, which can average around $12,000 per teacher in rural districts and over $25,000 in urban districts (LPI, 2024).

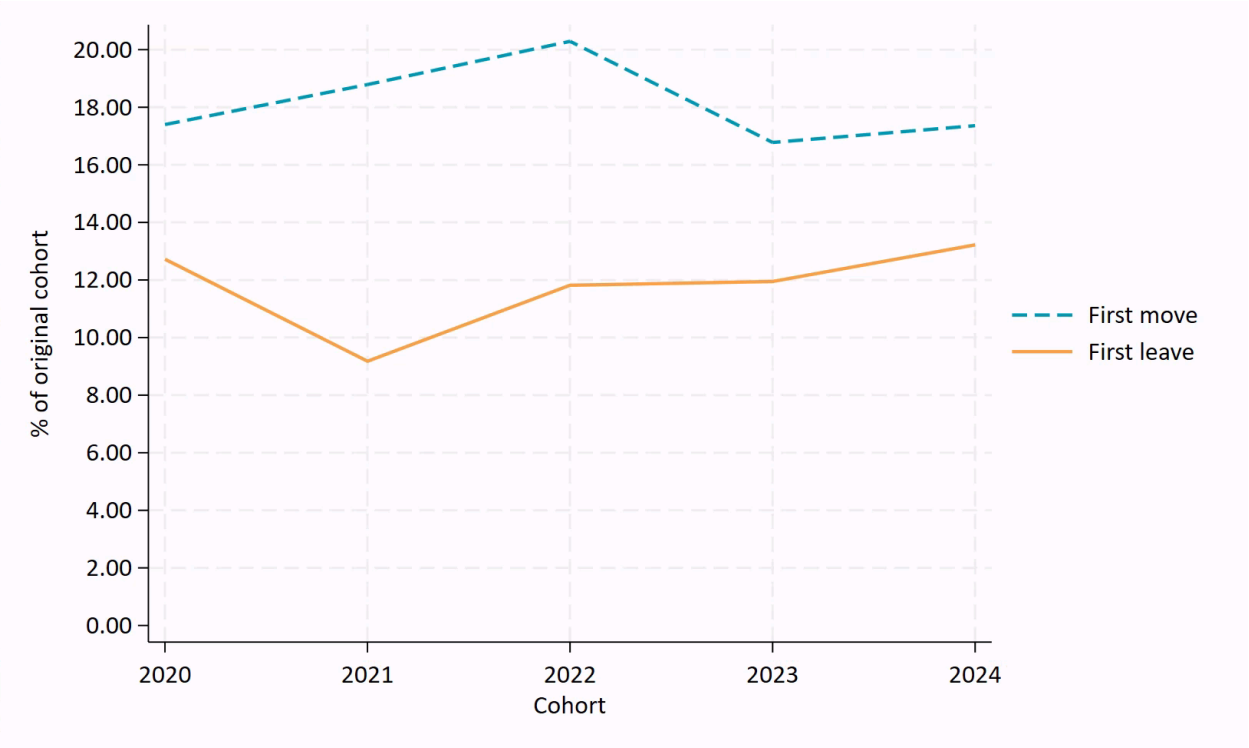
We examine beginning teacher turnover in California after one, three, and five years in the classroom, using the latest cohort data to generate each of these estimates. We report on both teachers moving to different schools in the same or a different district in CA and leaving teaching in public PK-12 schools in

CA. Although someone leaving teaching might return to the same school or a different one after more than a year, we consider future re-entrants as leavers in this paper. The data from CDE do not allow us to distinguish between stopping teaching entirely, moving to a private CA school, or moving and teaching in another state. In this report, we categorize all of these as leaving CA public PK-12 schools (hereafter, leaving).

To use the most recent data, our cohort comparisons cover different time periods and are not directly comparable. We first estimate first-year turnover rates by analyzing teachers who began teaching in 2023-24 and then moved schools or left teaching in California in 2024-25. Next, we consider three-year cumulative turnover rates for the cohort starting in 2021-22 and five-year cumulative turnover rates for the cohort that began teaching in 2019-20. We note that the three- and five-year rates were affected by COVID-19.

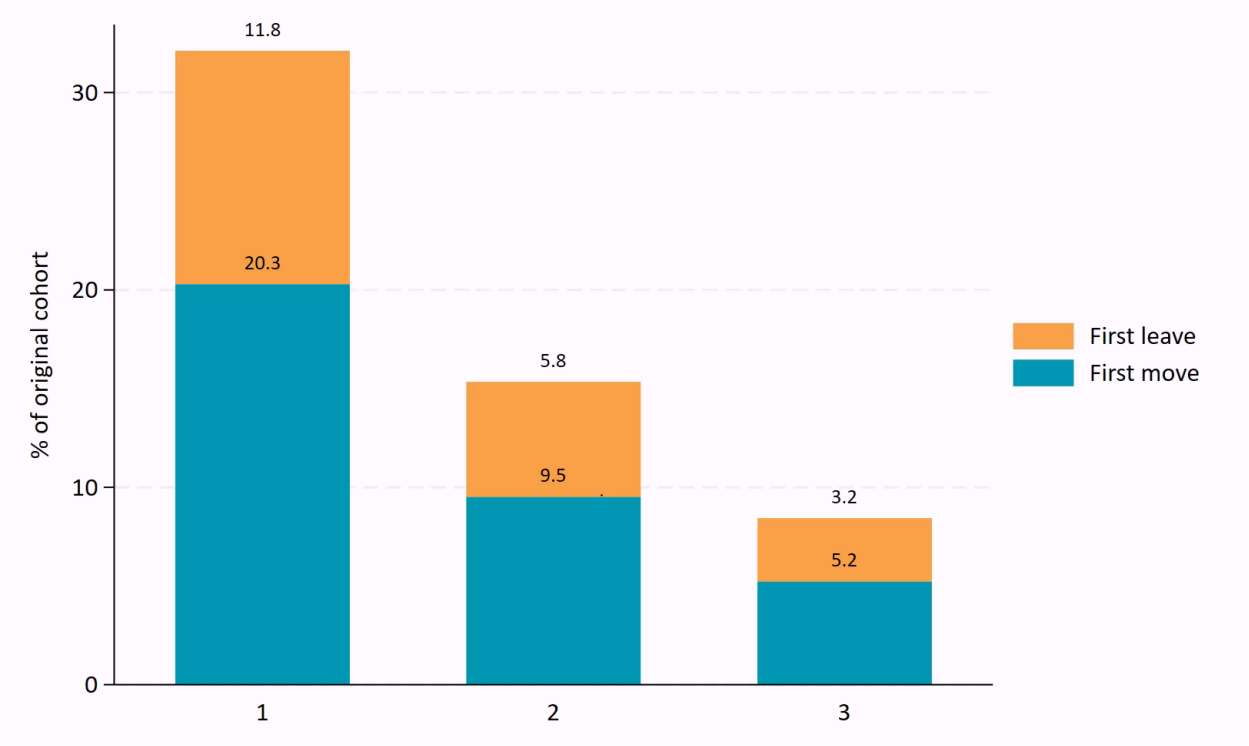
Among beginning teachers hired in 2023-2024, the turnover rate at the end of their first year was 30.6%, with 17.4% moving schools and 13.2% leaving public PK-12 teaching in CA (Figure 26). Turnover among the remaining teachers (stayers) decreases over the first five years of teaching, with moving schools being more common than leaving teaching. For example, beginning teachers hired in 2021-2022 had a turnover rate of 8.4% between their third and fourth year of teaching, with 5.2% moving schools and 3.3% leaving teaching (Figure 27). The cumulative turnover rate for teachers in this cohort after 3 years is 55.9%, with 35% having moved from their first school and 20.8% having left teaching. The cumulative turnover rate for beginning teachers who started teaching in 2019-2020 after 5 years is 87.3%, with 41.1% having moved from their first school and 28.6% having left public PK-12 teaching in CA (Figure 28).

**Figure 26.** *Turnover rates* (moving schools and leaving public K-12 teaching in California) *of beginning teachers after one year of teaching: 2019-20 to 2023-24.*



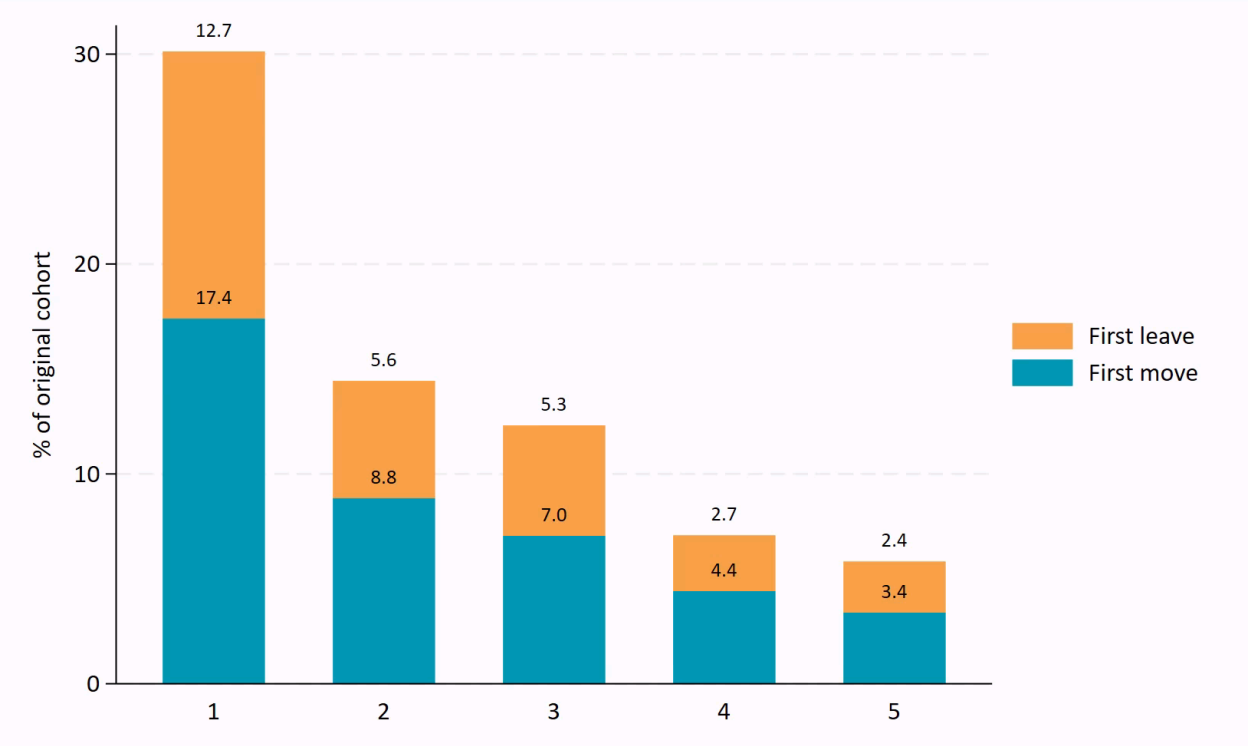

Note: First move occurs when a teacher moves from their first teaching placement. First leave is not teaching in public PK-12 in CA the following year.

**Figure 27.** *Turnover rates* (moving schools and leaving public K-12 teaching in California) *of beginning teachers after three years of teaching: Cohort starting 2021-22*




Note: Cumulative turnover rates (orange for leaving; blue for moving) are calculated by summing the annual rates.

**Figure 28.** *Turnover rates* (moving schools and leaving public K-12 teaching in California) *of beginning teachers after five years of teaching: Cohort starting 2019-20*




Note: Cumulative turnover rates (orange for leaving; blue for moving) are calculated by summing the annual rates.

## Turnover Rates of Beginning Teachers by Pathways

Prior research indicates that the route of preparation can influence turnover, with alternative certification (AC) pathways having higher turnover rates than traditional student teaching programs (TC) (Redding & Smith, 2016; 2019). Analyzing national data, Redding and Smith found that AC teachers often felt less prepared--specifically lacking experience in student teaching and classroom management. Early career teachers, particularly AC teachers, were less likely to be retained in schools with poor working conditions and less effective principal leadership. They also found, however, that AC teachers were more likely to leave the profession, TC teachers were sometimes more likely to move schools. Lack of administrative support and poor working conditions are positively associated with turnover for all teachers (Borman & Dowling, 2008; Grant & Brantlinger, 2022; Grissom, 2011; Ingersoll et al., 2019; Nguyen, et al., 2020).

As noted above, high levels of turnover, whether teachers move or leave, disrupt schools and are costly for districts. While changing schools can benefit individual teachers (e.g., better working environment, a closer match on teaching philosophy, higher pay, or proximity to where they want to live), high levels of teacher churn can hinder teacher collaboration, the development of relationships between teachers and families, and the building of trust between teachers and administrators. It can also be expensive and time-consuming to find replacements. Although external factors (e.g., declining enrollment or reduced funding) can lead to teacher turnover, district and school leaders have a responsibility to foster school climates and cultures where teachers can succeed and choose to stay.

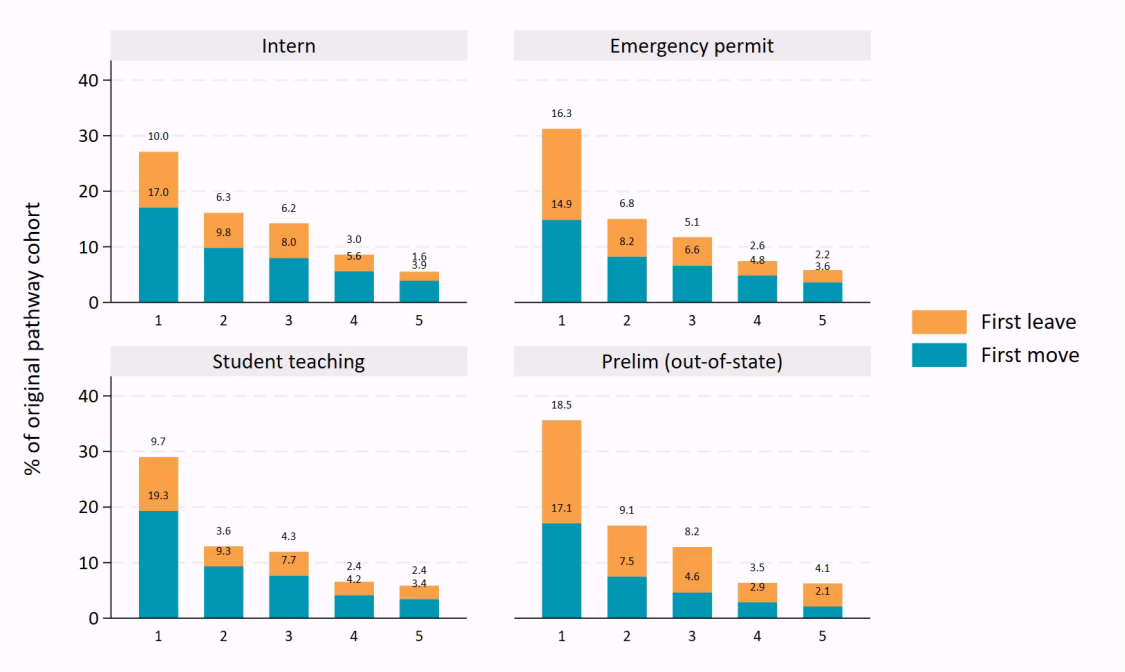
We find that one-year turnover rates are lower among beginning teachers hired in 2023-2024 entering through a student-teaching pathway (18.9% moving and 8.5% leaving) and intern pathway (19.1% moving and 8.2% leaving) than an emergency permit pathway (15.5% moving and 19.9% leaving) or preliminary (out-of-state) credential pathway (15.5% moving and 15.6% leaving). We would expect relatively low rates of leaving among intern credential holders, as most intern programs take two years to earn a preliminary credential. The relatively high turnover rate among beginning teachers with emergency permits (35.4%) suggests that these teachers are facing an unsustainable workload. Placing them in hard-to-staff classrooms without prior training, while simultaneously requiring them to earn their credential through a teacher education program, could be driving them out of the profession.

When examining three-year turnover rates, we observe greater differences across entry pathways. For teachers hired in 2021-2022, cumulative three-year turnover rates ranged from 52.3% for those entering through student teaching pathways to 63.1% for those starting on emergency permits. In other words, fewer than 50% of beginning teachers remain at the same school three years after starting teaching in California. Three-year cumulative leaving rates were lowest for those who started teaching with in-state preliminary credentials earned through student teaching programs (15.5%) and intern credentials (20.7%), and highest for those who started with emergency permits (30.9%) and for preliminary credentials holders who completed their teacher education program out of state (31.3%). (Data not shown).

Five years after starting teaching, the vast majority of teachers across all entry pathways have moved schools at least once or left teaching in California PK-12 public schools. For teachers hired in

2019-2020, cumulative five-year turnover rates ranged from 66.2% for entering through student teaching pathways to 77.1% for those entering through emergency pathways. The five-year cumulative leaving rate is highest for teachers who started with preliminary credentials trained out of state (43.4%), lower for teachers starting on an emergency permit (33.%), and lowest for in-state preliminary credential holders who completed a student teaching program (22.3%) and intern credential holders (27.1%) (Figure 29). The high leaving rates among preliminary credentialed teachers trained out of state may relate to temporary relocation to CA (such as a spouse in the military), limited job opportunities for inexperienced teachers in the state where they earned their credential, differences in the content of preparation models in other states, or visa and credentialing challenges (like difficulty in clearing a CA credential after 5 years because of California specific requirements).

**Figure 29.** *Turnover rates* (moving schools and leaving public K-12 teaching in California) *of beginning teachers after five years of teaching by entry pathways: Cohort starting 2019-20*




Note: Cumulative turnover rates (orange for leaving; blue for moving) are calculated by summing up the annual rates.

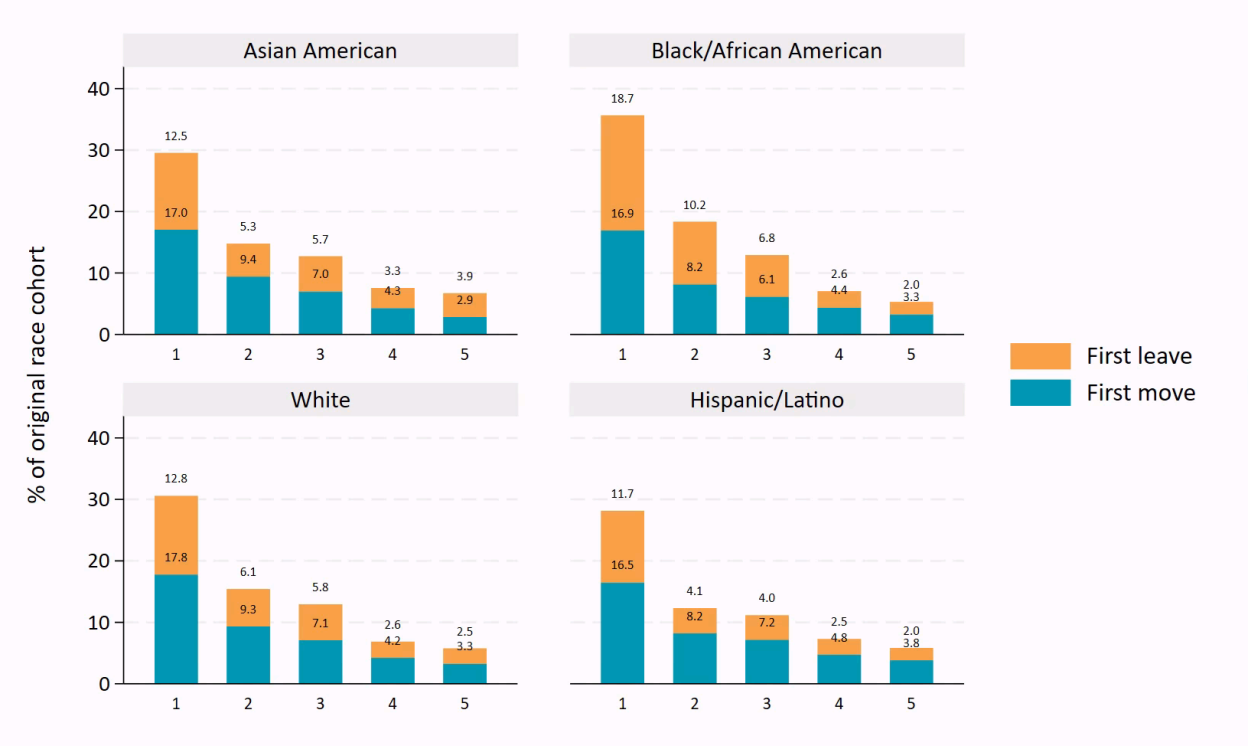
## *Turnover Rates of Beginning Teachers by* Race/Ethnicity

National data indicate that teachers of color move schools or leave the profession at a higher annual rate than White teachers (Carver-Thomas, 2018; Ingersoll & May, 2011). Black/African American and Hispanic/Latino teachers are often more likely to work in hard-to-staff schools (e.g., high-poverty, high-minority) with challenging conditions such as lower salaries and less administrative support, which contribute to higher turnover rates compared to their peers (Redding & Smith, 2016).

We analyze racial and ethnic differences in the 1-5 year turnover rates of the 2019-20 cohort of beginning teachers. While initial moving rates (i.e., changing schools) at the end of the first year are similar across racial and ethnic groups (ranging from 16.5% to 17.8%), Black/African American teachers have significantly higher rates of leaving public K-12 teaching in CA (18.7%) compared to Asian American (12.5%), Hispanic/Latino (11.7%), and White teachers (12.8%).

The pattern remains similar at the end of year 3, with cumulative moving rates between 31.2% and 34.2%, and cumulative rates of leaving public K-12 teaching in CA from 19.7% for Hispanic/Latino teachers to 35.6% for Black/African American teachers. By the end of year 5, cumulative rates of leaving public K-12 teaching in CA range from 24.3% for Hispanic/Latino teachers to 40.3% for Black/African American teachers.

**Figure 30.** T*urnover rates* (moving schools and leaving public K-12 teaching in California) *of beginning teachers after five years of teaching by race/ethnicity: Cohort starting 2019-20*




Note: Cumulative turnover rates (orange for leaving; blue for moving) are calculated by summing the annual rates.

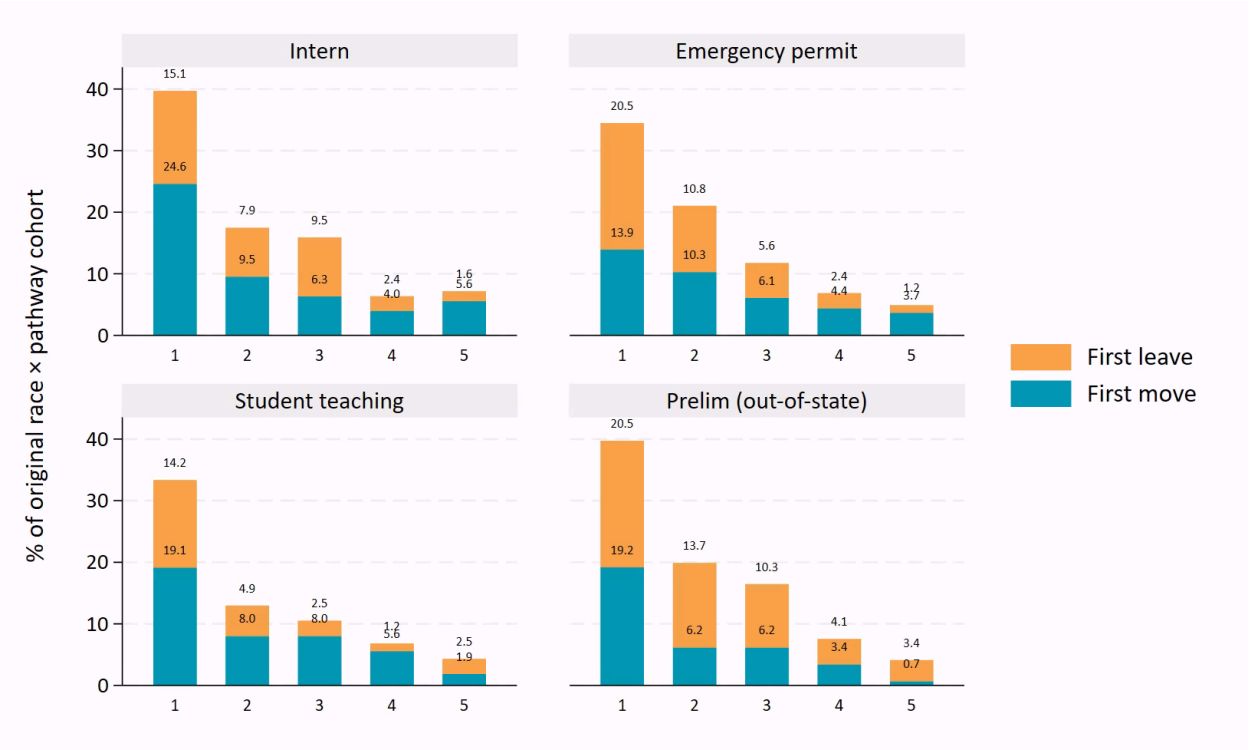
Because entry pathways and school contexts are not evenly distributed by race and ethnicity, differences in overall retention rates may mask important within-group patterns. We therefore next examine early-career mobility and attrition by race/ethnicity, with particular attention to whether disparities persist within entry pathways.

## Leaving Rates of Beginning Teachers by Pathways and Race/Ethnicity

To better understand the high rates of leaving public K-12 teaching in California among beginning Black/African American teachers, we examined differences in entry pathways by race/ethnicity. As mentioned previously, Black/African American teachers were more likely to start their careers on emergency permits (52.2%) than their Hispanic/Latino (36.5%), White (30.9%), or Asian American (24.9%) counterparts. In addition, beginning Black/African American (17.1%) and Hispanic/Latino (16%) teachers were more likely to hold an intern credential when they first started teaching than their White (14.5%) or Asian American (10.4%) counterparts. As cumulative five--year turnover rates are higher for teachers starting on emergency permits (33.0%) and intern credentials (27.1%) compared to those starting on a preliminary credential earned through a student teaching pathway (22.3%), we looked to see if differences between Black/African American and Hispanic/Latino leaving rates were related to higher rates of starting on emergency permits.

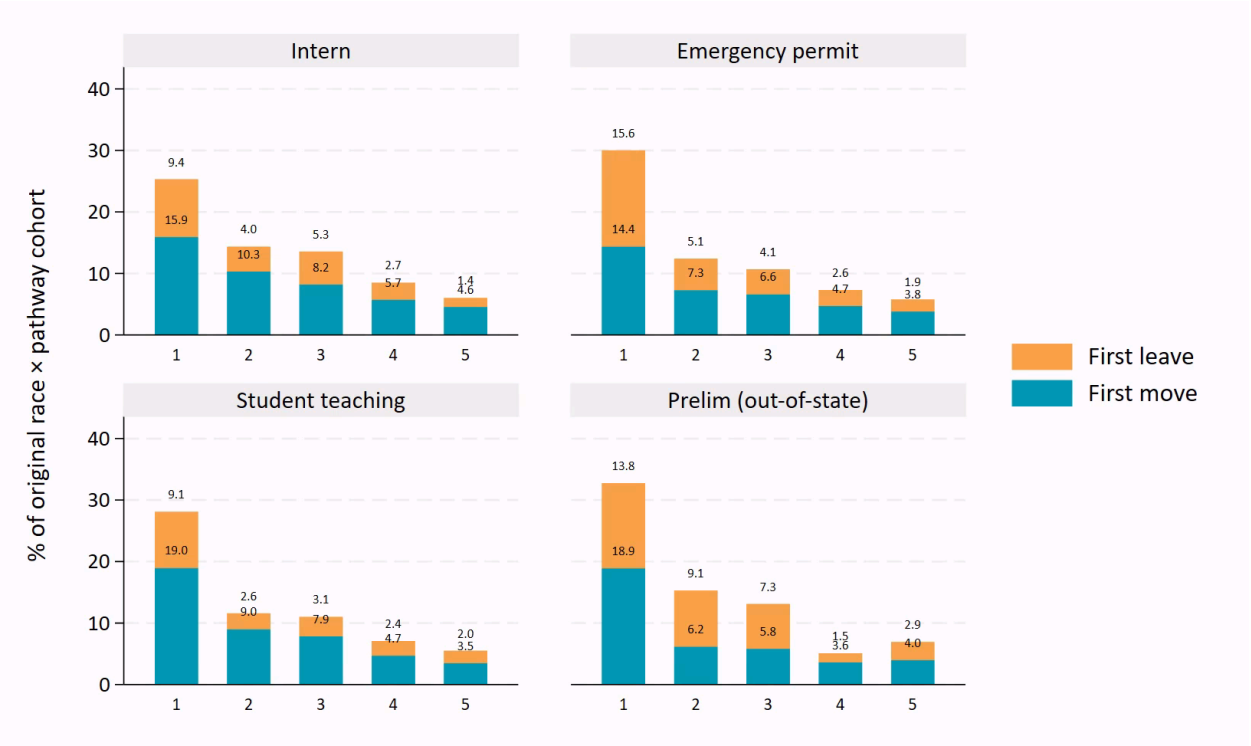
Among first-time teachers starting in 2019-20, Black/African American teachers have notably higher one-, three-, and five-year rates of leaving public K-12 teaching in California compared to Hispanic/Latino teachers across all four entry pathways (Figures 29 and 30). While 20.5% of Black/African American teachers starting on an emergency permit left public K-12 teaching in California after their first year, only 15.6% of Hispanic/Latino teachers did so. Cumulative leaver rates were even wider between Black/African American and Hispanic/Latino teachers who started on emergency permits at year 3 (36.9% and 24.8%, respectively) and at year 5 (40.6% and 29.3%, respectively). These patterns are similar across all pathways except student teaching, where differences are narrower. These data suggest that the entry pathway is not the only factor driving different leaver rates between these two traditionally underrepresented groups among teachers.

**Figure 31.** *Turnover rates (moving schools and leaving* public K-12 teaching *in California) of beginning Black/African American teachers after five years of teaching by entry pathways: Cohort starting 2019-20*




Note: Cumulative turnover rates (orange for leaving; blue for moving) are calculated by summing up the annual rates.

**Figure 32.** *Turnover rates (moving schools and leaving public K-12 teaching in California) of beginning Hispanic/Latino American teachers after five years of teaching by entry pathways: Cohort starting 2019-20*




Note: Cumulative turnover rates (orange for leaving; blue for moving) are calculated by summing up the annual rates.

The observed differences in early-career retention across entry pathways and racial groups are consistent with mechanisms emphasized in the teacher turnover literature. Prior research shows that turnover is strongly shaped by organizational conditions—including administrative support, mentoring and induction quality, instructional leadership, workload, and collegial climate—rather than preparation alone (Ingersoll, 2001; Borman & Dowling, 2008; Grissom, 2011; Nguyen et al., 2020). Teachers entering through emergency permits and intern pathways are often disproportionately placed in hard-to-staff schools that face persistent staffing shortages, higher student need, and weaker organizational supports, conditions that are themselves predictive of higher attrition (Carver-Thomas & Darling-Hammond, 2017; Ronfeldt et al., 2013). For teachers of color—particularly Black/African American teachers—these dynamics may be compounded by assignment patterns, limited access to experienced mentors, and less supportive professional environments, even within the same entry

pathway (Ingersoll & May, 2011; Redding & Smith, 2016). Taken together, this literature suggests that pathway differences in retention likely reflect not only differences in preparation or individual characteristics, but also systematic differences in where teachers are placed and the organizational conditions they encounter early in their careers.

While these descriptive patterns highlight substantial differences in retention across pathways, they do not account for variation in teacher characteristics or school contexts. To more precisely examine the relationship between entry pathways and early-career mobility and attrition, we next estimate multinomial logistic regression models that adjust for demographic characteristics, credential area, and features of teachers' initial school placements.

## Adjusted Turnover Rates

To comprehensively examine the career paths of beginning teachers, we employ two approaches to identify predictors of whether they transfer to a new school (move) or leave public K-12 teaching in CA early in their careers. We start by analyzing turnover, including both moving and leaving, after their first year as a teacher of record in the classroom. Then, we expand this analysis using a five-year discrete-time competing-risks framework to observe how these early patterns change over a longer period. In both approaches, our focus is on the influence of pathways into teaching. By sequentially controlling for individual teacher demographics and initial school characteristics, we aim to isolate the fundamental relationship between a teacher's preparation route and their likelihood of moving schools or leaving K-12 public teaching over the first five years of their career.

First, we analyze the turnover of beginning teachers from the beginning of their first year to the start of their second year across different entry pathways using multinomial logistic regression for cohorts from 2017-18 through 2023-24. We focus on these cohorts to utilize comparable school-level data from CDE (e.g., average school-level chronic absenteeism), which is only available for these years. The outcome has three categories: remaining at the initial school (reference), transferring to a different school within CA (moving), and leaving public K-12 teaching in CA. Results are presented as relative risk ratios or RRR, comparing the risk of moving or leaving to staying. The baseline group is the student teaching pathway.

In the unadjusted specification (M1), we assess the relative risk of moving or leaving compared to staying after the first year of teaching by entry pathway (student teaching (omitted), intern, emergency, preliminary credential-out of state). In the second model specification (M2), we examine the relative risk of leaving and moving based on demographic and background characteristics, including sex, race/ethnicity, age, and highest degree attained. The full model (M3) accounts for credential area (multiple subject, single subject, education specialist), school level (elementary, middle, high school, elementary-high school), district locale (city, suburban, rural), charter school status, unduplicated pupil count, school-level chronic absenteeism rate, and school-level suspension rate. All models include cohort fixed effects to account for differences across entry cohorts. The regression output table can be found in Table A3 of the appendix.

Across different specifications, pathway differences are larger for leaving than for moving. In the baseline model with pathways only (M1), teachers with emergency permits and out-of-state teachers with preliminary credentials face much higher leaving risks than teachers who went through student teaching before earning the preliminary credential, with relative risk ratios of 2.46 and 2.24, respectively. This indicates that a teacher on an emergency permit has 146% higher odds of leaving after the first year than a teacher who came through a student teaching pathway. This result is expected, since emergency permits are intended to last for only one year, although there are ways of stringing different types of emergency credentials together over multiple years. Intern teachers also have a slightly higher leaving risk in the baseline model, at 1.11. Since intern credentials are generally valid for two calendar years, this suggests that leaving rates during intern programs are slightly higher than the one-year attrition rates for beginning teachers entering through a student teaching pathway. Conversely, beginning teachers who enter through emergency, intern, or out-of-state preliminary pathways show lower moving risks than entrants through student teaching pathways, with relative risk ratios below 1.00 for interns (RRR = 0.91**), emergency permits (RRR = 0.90**), and out-of-state preliminary teachers (RRR = 0.94*).

In the second model specification (M2), we examine the relative risk of moving or leaving compared to staying after the first year of teaching by controlling for teachers' sex, race/ethnicity, degree level, and age. Between years 1 and 2 of teaching, female teachers have a 15% lower relative risk of leaving

compared to male teachers. The likelihood of moving is similar between women and men. Beginning Black/African American teachers have a 22% higher relative risk of leaving compared to White teachers, while Hispanic/Latino teachers have a 11% lower relative risk of leaving than White teachers. Beginning Asian American teachers have a 9.6% higher risk of turnover compared to their White counterparts. Risk of moving schools at the end of the first year is similar across racial/ethnic groups, with the exception of Hispanic/Latino teachers who have a 7% lower relative risk of moving compared to White teachers. The negative coefficient on age combined with a positive coefficient on age squared indicates a nonlinear relationship, whereby the likelihood of attrition declines with age initially but increases slightly at older ages.

The fully adjusted model (M3), which includes teacher demographics, degrees, and credential areas, and school context, largely preserves the differences in turnover based on entry pathway. Emergency permit teachers have about 2.64 times higher odds of leaving after the first year compared to entrants through student teaching pathways, while out-of-state preliminary teachers have roughly 2.10 times higher odds of leaving. Intern teachers show a smaller yet still statistically significant increased risk of leaving at 1.10. Regarding moving, the adjusted model (M3) continues to indicate a lower relative risk of changing schools after the first year for interns (RRR = 0.90**), emergency permit holders (RRR = 0.87**), and out-of-state preliminary teachers (RRR = 0.90**). The fact that the estimates for emergency permit and out-of-state preliminary teachers stay consistent after adjustment suggests that differences in teacher characteristics and school conditions do not explain the observed variations in leaving rates.

Beyond pathways, the fully adjusted model highlights specific individual characteristics associated with early turnover. Female teachers have a lower relative risk of both moving (RRR = 0.93**) and leaving (RRR = 0.89**) than male teachers. Relative to white teachers, Hispanic or Latino teachers have a lower risk of moving (RRR = 0.93**) and leaving (RRR = 0.84**), while Asian American teachers have a higher leaving risk (RRR = 1.18**). Each additional year of age is initially associated with a 3.6% decrease in relative risk (RRR = 0.964**); however, the significant quadratic term (RRR = 1.001**) demonstrates that this downward trend slightly flattens later in life.

Several teacher education levels and credential area factors are also associated with outcomes. Beginning teachers with single-subject credentials have a higher leaving risk (RRR = 1.17**) relative to the multiple-subject credential holders. There is no significant or substantive difference in the risk of leaving or moving between multiple subject credential holders and those holding education specialist credentials. Working in high schools is associated with a lower risk of both moving (RRR = 0.68**) and leaving (RRR = 0.74**) compared to the elementary school level. Charter school teachers have a lower risk of moving (RRR = 0.80**) but a higher risk of leaving (RRR = 1.27**) than their counterparts at other public schools. A one-percentage-point increase in chronic absence rates is associated with approximately a 0.3% increase in the relative risk of teacher attrition, while a one-percentage-point increase in suspension rates corresponds to about a 1.3% increase in the relative risk of teacher mobility.

Compared to teachers in the lowest-UPC quartile schools, those in higher-UPC schools generally face lower risks of mobility and attrition. In the fully adjusted model, teachers in the highest-UPC quartile are about 10% less likely to move, while teachers in the second and third quartiles are 7–9% less likely to leave. One reason for this could be that a higher UPC indicates significantly more targeted state funding (via LCFF). These schools might be using those funds to offer more competitive salaries. Locale is modestly associated with moving, with suburban settings showing a slightly higher moving risk (RRR = 1.07*) relative to the urban locale. Suburban areas can have multiple smaller school districts clustered close together. Cohort indicators in the adjusted model point to meaningful year-to-year differences in mobility and leaving relative to the 2018 cohort. Recent cohorts show lower leaving risk, while moving risk was higher in 2021 (RRR = 1.15**) and 2022 (RRR = 1.26**).

Taken together, the adjusted turnover models demonstrate that entry pathways into teaching are strongly associated with early-career attrition, even after accounting for teacher demographics, credential area, and the characteristics of teachers' initial school placements. Teachers entering on emergency permits and those prepared out of state exhibit significantly higher risks of leaving California public K–12 teaching at the end of the first year, while differences in school-to-school mobility are more modest across pathways. The persistence of pathway differences after adjustment suggests that early attrition is not solely a function of demographic sorting or initial placement.

However, it reflects structural features of how teachers enter and experience the profession. At the same time, these one-year models capture only the immediate risk of leaving or moving and do not reveal how retention and mobility unfold over the full early career. To better understand the timing, accumulation, and evolution of pathway-based differences in retention, we next examine teachers' mobility and attrition over five years using a discrete-time competing-risks framework.

## Five-Year Retention Models

Next, we estimated beginning teachers' mobility and attrition using a discrete-time competing-risks hazard framework implemented as a multinomial logit model. The multinomial discrete-time competing-risks models estimate relative risk ratios (RRRs) for experiencing a first move to a different school or a first exit from public K-12 teaching in CA in a given year (each compared to no event/staying at risk as the baseline outcome), conditional on having had no prior event. Throughout, student teaching is the omitted pathway category, so pathway coefficients compare each alternative pathway to student teaching in the same year. To isolate the relationship between entry pathways and retention, we build our models sequentially, first establishing a baseline (M1) and then introducing teacher (M2) and school-level (M3) controls.

In the unadjusted specification (M1), pathway differences are substantially larger for leaving than for moving (see Table A4 in the Appendix). In year 1, both teachers who started on emergency permits (RRR = 2.20**) and those trained out of state on preliminary credentials (RRR = 2.25**) show roughly double the relative risk of leaving compared to entrants from student-teaching pathways. In contrast, pathway differences in moving are relatively small at baseline. Emergency permit holders are less likely to move than preliminary credential holders who completed student-teaching pathways in year 1 (RRR = 0.89**), whereas interns (RRR = 0.96) and out-of-state preliminary teachers (RRR = 0.996) are not statistically or meaningfully different from the baseline. Because the model interacts with the pathway over time, the year-specific pathway gaps change over the first five years. In this model, without additional controls, the coefficient pattern predicts earlier leaving for emergency permit holders and later moving for interns, compared with those who entered through a student-teaching pathway.

The teacher-adjusted specification (M2) adds teacher demographics and education (gender, race/ethnicity, age, and age², highest degree) to our baseline model (M1). Emergency permit and out-of-state preliminary teachers remain significantly more likely to leave than student teaching teachers in year 1 (RRR = 1.89** and 1.92**, respectively), and emergency permit teachers remain less likely to move (RRR = 0.89**). At the same time, several teacher factors are statistically significant and help explain within-pathway heterogeneity. Female teachers have a lower leaving risk in year 1 (RRR = 0.828**), and Black/African American teachers have a higher leaving risk relative to White teachers (RRR = 1.273**). In comparison, Hispanic/Latino teachers have a lower leaving risk (RRR = 0.907**). Age shows a nonlinear association with leaving (age 0.942** paired with age² 1.001**), indicating that the leaving risk decreases with age at younger ages, increasing slightly as age increases. Degree categories are also predictive: holding higher degrees (excluding doctorates) is generally associated with a higher moving risk but a lower leaving risk.

In the fully adjusted specification (M3), which controls for both teacher characteristics and school context, pathway gaps in leaving remain sizable and statistically significant. This indicates that differences in demographics and the context of initial placements do not fully account for pathway-based attrition. Emergency permit teachers and out-of-state preliminary teachers still exhibit a substantially higher leaving risk than student teaching teachers in year 1 (RRR = 1.83** and 1.69**, respectively). For teachers on emergency permits, the relative risk ratio of leaving decreases by 31 percentage points from M1 to M2, and by an additional 6 percentage points in M3. Out-of-state preliminary teachers see an even larger reduction, dropping 33 percentage points from M1 to M2, and 23 percentage points from M2 to M3. Regarding moving, the only notable shift between M2 and M3 occurs for emergency permit teachers. Finally, the moving and leaving risks for intern teachers remain insignificantly different from the traditional student teaching pathway across all three specifications.

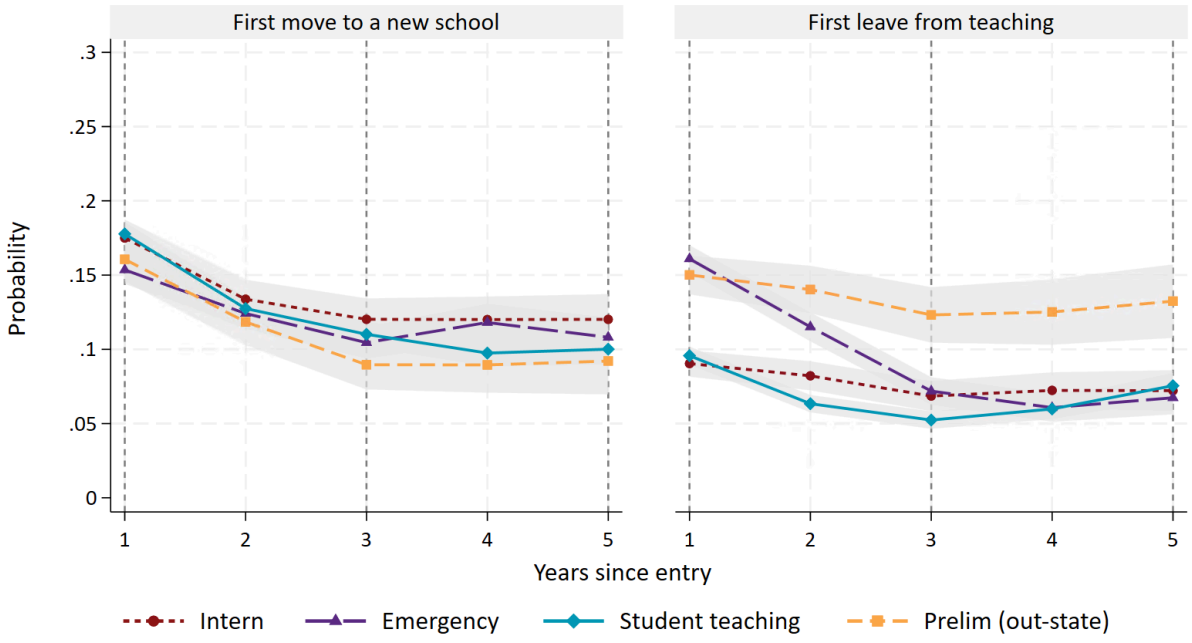
Several school/context covariates are also significant in this model. For example, teachers in high schools have substantially lower risks of both moving (RRR = 0.834** for high school vs elementary) and leaving (RRR = 0.724**), and charter school teachers show lower moving risk (RRR = 0.888*) but higher leaving risk (RRR = 1.198**). Locale is associated with different types of turnover. Teachers in suburban settings (vs urban) have a slightly higher moving risk (RRR = 1.072*) but a lower leaving risk

(RRR = 0.861**). Finally, higher suspension rates are associated with higher leaving risk (RRR = 1.053**), and chronic absenteeism shows a negative association with leaving in year 1 (RRR = 0.992**). This means that a one-percentage-point increase in the suspension rate is associated with approximately a 5.3% increase in the relative risk of leaving, while a one-percentage-point increase in chronic absenteeism is associated with about a 0.8% decrease in the relative risk of leaving.

Across all three specifications, the predicted first-move hazard is strongly front-loaded and then stabilizes. As illustrated by the fully adjusted trajectories in Figure 33, the pathways generally cluster around similar initial moving probabilities in year 1, followed by a common drop by year 2 and further convergence around year 3. After year 3, the curves flatten, though a small ordering emerges in which interns and emergency-permit teachers show slightly higher move probabilities in years 4–5 than their peers.

In contrast, the predicted first-leaving hazard shows much sharper pathway differentiation. Preliminary out-of-state teachers consistently have the highest leaving probability, while the student teaching pathway remains the lowest. Emergency-permit teachers show a distinctive pattern of much higher early leaving followed by a steep decline by year 3, suggesting that more attrition in this pathway is concentrated early in the career. Notably, transitioning from the unadjusted to the fully adjusted models produces only modest changes to these trajectories, primarily a slight reduction in early leaving levels (see the Appendix figures A1 and A2 for unadjusted and teacher-adjusted baseline probabilities).

**Figure 33.** *Fully adjusted predicted probabilities of moving from the first school (left) and leaving public K-12 in California (right) over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*



The cumulative incidence curves for a first move (Appendix figures A3-A5) highlight the same story: most mobility accumulates early and then increases more gradually over time, with only modest pathway separation. The fully adjusted CIF plots overlap nearly entirely with the baseline models, both in overall levels and in the ordering of pathways.

Lastly, the cumulative incidence curves for a first exit from teaching in public K-12 schools in CA (Appendix figures A6-A8) display substantially larger and more persistent pathway separation than the move CIFs, and that separation emerges early and widens over time. The fully adjusted curves shift only modestly from the unadjusted baselines, preserving the consistent ordering and widening gaps over time. The persistence of these gaps across all specifications suggests that pathway-specific attrition is not explained by differences in demographic characteristics across pathways or the context of initial school placements that we were able to measure.

In summary, the one-year and five-year models demonstrate that the pathway by which a teacher enters the profession is strongly associated with their likelihood of remaining in California public schools. Across both modeling approaches, teachers entering on emergency permits or with out-of-state preliminary credentials face a substantially higher risk of leaving than their peers who entered through student teaching pathways. This elevated attrition is concentrated in the first year of teaching and continues to accumulate over time, while pathway differences in school-to-school mobility remain comparatively modest. Importantly, these pathway-based disparities persist even after accounting for teacher demographics and initial school contexts, indicating that early attrition cannot be fully explained by demographic composition or school placement alone.

Taken together, these findings suggest that early-career turnover is shaped by structural features of how teachers enter and experience the profession, rather than context of their first placement or individual characteristics. However, leaving California public schools represents only one possible outcome. Many teachers remain in the workforce but follow markedly different credentialing and employment trajectories. To capture this broader set of early-career pathways, we next examine what beginning teachers who enter through different routes are doing three and five years after their initial

entry. Examining these trajectories provides insight into whether early-career attrition reflects permanent loss to the workforce or uneven progression toward full preparation and credentialing.

## What beginning teachers who enter through different pathways are doing three and five years later

While the adjusted one-year models capture immediate differences in early-career mobility and attrition across entry pathways, they do not show how these risks accumulate or change over time. To examine longer-run retention dynamics, we next estimate five-year mobility and attrition using discrete-time competing-risks models. Teachers who do not leave may follow very different employment and credentialing trajectories, including transitions from emergency permits to intern or preliminary credentials, successful completion of preparation programs, or continued teaching under temporary authorizations. To better understand these longer-term patterns, this section examines what beginning teachers who enter through different pathways are doing three and five years after their initial entry into teaching.

Tables 2 and 3 illustrate that early-career retention patterns vary not only in whether teachers remain in California public K–12 schools, but also in how those who remain progress through the credentialing system. Beginning teachers entering through student teaching pathways are the most likely to transition quickly to a clear credential: by year three, a majority have already cleared their preliminary credential, and by year five, over two-thirds hold a clear credential and remain teaching. Teachers who begin with intern credentials follow a similar, though slower, progression, with most advancing to preliminary or clear credentials over time and a substantial share remaining in the workforce five years later. In contrast, teachers who enter on emergency permits display more heterogeneous trajectories, with a sizable portion transitioning into intern programs or preliminary credentials through student teaching pathways, but also higher rates of continued teaching under temporary authorizations and higher overall leaving rates. Out-of-state preliminary credential holders show relatively high rates of progression to clear credentials among those who remain, but also the highest cumulative rates of exit from public K-12 schools in California by year five, suggesting greater geographic or labor market mobility rather than stalled credential progression.

**Table 2.** *Percentage distribution of teaching status (row) by entry pathways at year 3 (column): average across cohorts 2019-20 to 2020-21*

| | Entry pathway | | | | |
|---|---|---|---|---|---|
| Teaching status after three years of teaching | Emergency permit | Intern credential | Student teaching | Preliminary credential (out-of-state) | Overall |
| Teaching: No active credential | 3 | 1 | 0 | 0 | 1 |
| Teaching: Emergency permit | 4 | 0 | 0 | 0 | 1 |
| Teaching: Intern Credential | 19 | 8 | 0 | 0 | 6 |
| Teaching: Preliminary Credential | 37 | 58 | 24 | 32 | 33 |
| Teaching: Clear Credential | 12 | 16 | 61 | 36 | 39 |
| Left teaching by/before year 3 | 26 | 18 | 15 | 32 | 20 |

**Table 3.** *Percentage distribution of teaching status (row) by entry pathways at year 5 (column): average across cohorts 2019-20 to 2020-21*

| | Entry pathway | | | | |
|---|---|---|---|---|---|
| Teaching status after five years of teaching | Emergency permit | Intern credential | Student teaching | Preliminary credential (out-of-state) | Overall |
| Teaching: No active credential | 2 | 1 | 0 | 0 | 1 |
| Teaching: Emergency permit | 1 | 0 | 0 | 0 | 0 |
| Teaching: Intern Credential | 3 | 1 | 0 | 0 | 1 |
| Teaching: Preliminary Credential | 19 | 14 | 2 | 7 | 9 |
| Teaching: Clear Credential | 37 | 53 | 72 | 45 | 57 |
| Left teaching by/before year 5 | 38 | 31 | 26 | 48 | 32 |

Importantly, these patterns reinforce the distinction between attrition from teaching and uneven progression toward full credentialing. Among teachers who remain in the system, pathway differences are reflected less in permanent stalling at temporary authorization levels than in the speed and certainty with which teachers advance toward clear credentials. Student teaching and intern pathways function as relatively structured routes through the credentialing system. In contrast, emergency permits often represent entry under conditions of uncertainty, where advancement depends heavily on access to preparation programs, employer support, and working conditions. For out-of-state prepared

teachers, higher leaving rates coexist with relatively successful credential clearance among those who stay, highlighting the role of mobility and integration into California's credentialing system rather than preparation deficits per se.

Taken together, these trajectory patterns clarify how entry pathways shape workforce stability beyond simple retention measures. Student teaching and intern pathways are associated not only with lower early attrition but also with more predictable progression toward clear credentials. Emergency permits, while successfully serving as on-ramps for many teachers, are also associated with more uneven credential advancement and higher risks of leaving. Similarly, out-of-state prepared teachers who remain tend to integrate successfully into the credentialing system. However, higher overall leaving rates suggest challenges related to mobility, credential portability, or professional attachment to California schools. These findings underscore that improving workforce stability requires coordinated attention to how teachers enter the profession, how they are supported in progressing toward full credentialing, and how early-career working conditions interact with credentialing pathways—insights that directly inform the policy implications discussed below.

# Summary and Policy Implications

The findings presented above demonstrate that workforce stability in California emerges from the interaction of how teachers enter the profession, where they are initially placed, and the conditions they encounter early in their careers. Over the past decade, California's teacher pipeline has shifted substantially, with important implications for workforce stability, equity, and students' access to experienced educators. The share of new teachers entering through student teaching pathways has declined, while reliance on emergency permits has increased across the state. Intern credentials have remained relatively stable in aggregate, but are increasingly concentrated in high-need schools and shortage subject areas. These patterns reflect structural staffing pressures rather than short-term shocks and signal a growing dependence on less-prepared entry routes to meet immediate classroom needs.

These shifts in entry pathways are closely tied to where teachers begin their careers. Teachers entering through emergency permits, intern pathways, and out-of-state preparation routes are disproportionately placed in schools serving higher concentrations of high-need students and in organizational contexts marked by elevated staff turnover and fewer supports for novice teachers. Across descriptive and model-based analyses, these initial placements are strongly associated with early-career mobility and attrition. In this way, pipeline changes translate into patterned placements, which in turn shape retention and mobility outcomes—reinforcing inequities in staffing stability across schools.

Entry pathways are associated with markedly different retention trajectories. Teachers who enter through student teaching pathways exhibit the lowest rates of leaving California public K–12 teaching over one, three, and five years. In contrast, teachers who begin on emergency permits face substantially higher first-year attrition, even though many subsequently earn intern, preliminary, or clear credentials. These findings underscore the dual role of emergency permits within California's educator workforce system. Emergency permits remain a critical staffing mechanism in the state. However, they also mark entry into the most organizationally strained contexts, where teachers are expected to meet high levels of student need with limited structural support. Without intentional,

equity-centered investments in early-career supports and working conditions, continued reliance on emergency permits is likely to perpetuate workforce instability in the very schools that experience chronic shortages.

Teachers entering California with preliminary credentials earned from out-of-state teacher preparation programs have the highest five-year leaving rates across all pathways. This pattern likely reflects a combination of geographic mobility, temporary relocation to California, differences across state preparation systems, and challenges associated with credential clearance and professional integration. These findings point to the importance of credentialing and induction systems—alongside preparation pathways—in shaping retention. Improving retention among out-of-state prepared teachers represents a strategic opportunity for stabilizing the workforce through clearer articulation of requirements, streamlined credential transitions, and stronger alignment between CTC licensure processes, district hiring practices, and induction supports.

Racial disparities in retention persist across the early career and are not fully explained by differences in entry pathways or school placement alone. Black/African American teachers experience higher rates of leaving California public schools at each stage of the first five years, including within the same entry pathways. While teachers of color are more likely to begin their careers in high-need schools—contributing to higher overall attrition—the persistence of racial gaps within pathways highlights the role of additional factors. Prior research points to differences in working conditions, mentoring and induction experiences, assignment practices, leadership climate, and organizational cultures that may differentially shape the experiences of teachers of color. These findings underscore the need for racially responsive and equity-centered retention strategies that extend beyond increasing access to preparation pathways.

The results presented in this report estimate associations rather than causal effects of entry pathways themselves. Teachers select into pathways for different reasons, and entry routes are systematically linked to school contexts. Nonetheless, the patterns documented here have clear policy relevance. Entry pathways structure early-career experiences, shape initial placements, and determine exposure to school conditions that strongly influence mobility and retention.

From a policy perspective, these findings align closely with—and point to opportunities within—existing California Commission on Teacher Credentialing (CTC) and California Department of Education (CDE) initiatives. First, stabilizing the workforce requires renewed investment in student teaching and residency pathways through programs such as the Teacher Residency Grant Program, Golden State Teacher Grants, and partnerships with CSU, UC, and LEA-based preparation providers. Paid clinical experiences, such as the soon-to-be-implemented Student Teaching Stipend, can reduce reliance on emergency permits while strengthening racially responsive recruitment into the profession.

Second, because emergency permits are likely to remain a necessary staffing tool, improving retention requires strengthening the systems surrounding them. CTC policies governing permit issuance, intern enrollment, and credential progression can be better aligned to ensure that emergency-permit teachers are more easily connected to preparation pathways and induction supports. At the district level, CDE guidance and accountability mechanisms can promote equity-centered assignment practices, reduce class loads, and provide access to high-quality mentoring for teachers serving under emergency authorizations.

Third, addressing high attrition among out-of-state prepared teachers calls for improved credential portability and integration into California's induction system. Streamlining credential clearance requirements, clarifying timelines, and strengthening coordination between CTC licensure processes, induction providers, and district HR offices could improve retention for this group while maintaining standards. These efforts align with the state's broader goals of workforce stability without expanding reliance on emergency permissions.

Finally, reducing racial disparities in teacher retention requires explicit, equity-centered interventions that extend beyond pathway access. These include monitoring and addressing racially patterned placements in the highest-need schools, expanding culturally responsive mentoring and induction models, strengthening school leadership capacity to support teachers of color, and creating working conditions that foster professional growth and long-term retention. CDE initiatives focused on differentiated assistance, school improvement, and educator quality provide important levers for embedding these strategies within existing accountability and support systems.

Taken together, the findings demonstrate that workforce stability emerges from the interaction of how teachers enter the profession, where they are placed, and the conditions under which they work early in their careers. Policies that attend intentionally to all three—pipeline, placement, and support—are essential for advancing a more stable, racially responsive, and equitable teacher workforce across California.

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# Appendix

**Equation: Discrete-Time Competing-Risks Hazard Model Specification**

To characterize the five-year turnover dynamics and distinguish mobility from leaving as competing risks, we estimated the following pooled multinomial logistic regression model:

$$\ln ln\left[\frac{P(y_{it}=k)}{P(y_{it}=0)}\right] = \alpha_k + \sum_{\tau=2}^{5} \lambda_{k\tau} I(t = \tau) + \theta_k Pathway_i + \gamma_k C_i + \delta_k X_{it}$$

$$+ \sum_{\tau=2}^{5} I(t = \tau)\left[\beta_{k\tau} Pathway_i + \psi_{k\tau} C_i + \phi_{k\tau} X_{it}\right]$$

Where:

- $\ln ln\left[\frac{P(y_{it}=k)}{P(y_{it}=0)}\right]$: The log-odds of a teacher $i$ experiencing event $k$ ($1 = Move$, $2 = Leave$) in year $t$, relative to the base outcome of no event ($0 = Stay$).
- $\alpha_k$: The global intercept (baseline hazard at $t = 1$ for the reference pathway, reference cohort, and baseline covariates).
- $\sum_{\tau=2}^{5} \lambda_{k\tau} I(t = \tau)$: The main effects for time, capturing the baseline hazard deviations for years 2 through 5.
- $\theta_k Pathway_i$: The main effect of the entry pathway at $t = 1$.
- $\gamma_k C_i$: The main effect of cohort fixed effects at $t = 1$.
- $\delta_k X_{it}$: The main effect of adjusted covariates at $t = 1$.
- $\sum_{\tau=2}^{5} I(t = \tau)[\ldots]$: The interaction term block, multiplying the time indicators by the predictors to allow their slopes to vary by year.
    - $\beta_{k\tau}$: The time-varying coefficients for the entry pathway.
    - $\psi_{k\tau}$: The time-varying coefficient vectors for the cohort fixed effects.
    - $\phi_{k\tau}$: The time-varying coefficient vectors for the adjusted covariates.

**Table A1**. *Descriptive Statistics by Entry Pathway: cohorts 2017-18 to 2024-25*

| | Overall | | Student teaching | | Prelim Out-of-State | | Intern | | Emergency | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | N | Percent | N | Percent | N | Percent |
| Race/Ethnicity | | | | | | | | | | |
| Asian American | 111319 | 9% | 50360 | 11% | 12620 | 13% | 17259 | 8% | 31080 | 6% |
| Black/African American | 111319 | 5% | 50360 | 2% | 12620 | 6% | 17259 | 6% | 31080 | 8% |
| White | 111319 | 48% | 50360 | 50% | 12620 | 63% | 17259 | 45% | 31080 | 41% |
| Hispanic/Latino | 111319 | 35% | 50360 | 34% | 12620 | 16% | 17259 | 39% | 31080 | 42% |
| Multiracial/other | 111319 | 3% | 50360 | 3% | 12620 | 2% | 17259 | 3% | 31080 | 3% |
| Gender | | | | | | | | | | |
| Female | 120321 | 74% | 54088 | 75% | 13699 | 79% | 18586 | 70% | 33948 | 71% |
| Male | 120321 | 26% | 54088 | 25% | 13699 | 21% | 18586 | 30% | 33948 | 29% |
| Age | | | | | | | | | | |
| Mean | 117171 | 32.70 | 52921.00 | 30.88 | 13245 | 35.86 | 18010 | 33.09 | 32995 | 34.14 |
| Highest Degree Earned | | | | | | | | | | |
| Associate | 117155 | 1% | 52911 | 0% | 13242 | 0% | 18009 | 1% | 32993 | 1% |
| BA | 117155 | 57% | 52911 | 44% | 13242 | 48% | 18009 | 72% | 32993 | 72% |
| BA plus 30 | 117155 | 18% | 52911 | 26% | 13242 | 9% | 18009 | 12% | 32993 | 10% |
| Doctorate | 117155 | 1% | 52911 | 0% | 13242 | 1% | 18009 | 1% | 32993 | 1% |
| Master | 117155 | 18% | 52911 | 21% | 13242 | 32% | 18009 | 9% | 32993 | 10% |
| None | 117155 | 3% | 52911 | 3% | 13242 | 2% | 18009 | 3% | 32993 | 3% |
| Master plus 30 | 117155 | 4% | 52911 | 5% | 13242 | 6% | 18009 | 2% | 32993 | 2% |
| Credential Type | | | | | | | | | | |
| Multiple Subject | 114328 | 46% | 52834 | 51% | 12496 | 49% | 17316 | 33% | 31682 | 43% |
| Single Subject | 114328 | 38% | 52834 | 44% | 12496 | 45% | 17316 | 33% | 31682 | 30% |
| Education Specialist | 114328 | 16% | 52834 | 6% | 12496 | 6% | 17316 | 34% | 31682 | 28% |
| School Level | | | | | | | | | | |
| Elementary | 117658 | 49% | 52828 | 50% | 13413 | 48% | 18191 | 45% | 33226 | 51% |
| Elem.-High Combination | 117658 | 7% | 52828 | 6% | 13413 | 10% | 18191 | 8% | 33226 | 8% |
| High School | 117658 | 26% | 52828 | 26% | 13413 | 24% | 18191 | 28% | 33226 | 24% |
| Intermediate/Middle/Jr. High | 117658 | 18% | 52828 | 17% | 13413 | 18% | 18191 | 19% | 33226 | 18% |
| District Locale | | | | | | | | | | |
| City | 105770 | 50% | 48225 | 49% | 11975 | 49% | 16437 | 53% | 29133 | 49% |
| Suburban | 105770 | 40% | 48225 | 44% | 11975 | 38% | 16437 | 37% | 29133 | 35% |
| Rural | 105770 | 11% | 48225 | 8% | 11975 | 12% | 16437 | 10% | 29133 | 16% |
| Charter School | | | | | | | | | | |
| Non-charter | 117658 | 81% | 52828 | 84% | 13413 | 72% | 18191 | 77% | 33226 | 82% |
| Charter | 117658 | 19% | 52828 | 16% | 13413 | 28% | 18191 | 23% | 33226 | 18% |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| UPC Quartile | | | | | | | | | | |
| Q1 lowest | 119355 | 22% | 53549 | 25% | 13663 | 30% | 18448 | 16% | 33695 | 15% |
| Q2 | 119355 | 25% | 53549 | 25% | 13663 | 27% | 18448 | 23% | 33695 | 23% |
| Q3 | 119355 | 26% | 53549 | 24% | 13663 | 23% | 18448 | 28% | 33695 | 31% |
| Q4 highest | 119355 | 27% | 53549 | 25% | 13663 | 21% | 18448 | 33% | 33695 | 30% |
| Chronic Absence Rate | 89524 | 22.02 | 41102 | 20.89 | 10072 | 20.26 | 14006 | 23.04 | 24344 | 24.05 |
| Suspension Rate | 105117 | 3.20 | 47934 | 2.80 | 11946 | 3.18 | 16346 | 3.33 | 28891 | 3.78 |
| Spending | | | | | | | | | | |
| Adjusted school spending | 43652 | 16379.56 | 20414 | 16107.46 | 4039 | 15958.58 | 6474 | 16692.93 | 12725 | 16790.27 |
| Adjusted salary (lower bound) | 72909 | 56438.04 | 34057 | 56689.85 | 7530 | 55390.57 | 11247 | 56395.10 | 20075 | 56427.80 |
| Single Subject | | | | | | | | | | |
| English | 70119 | 14% | 33125 | 13% | 7362 | 15% | 10559 | 15% | 19073 | 13% |
| Math | 70119 | 9% | 33125 | 9% | 7362 | 10% | 10559 | 11% | 19073 | 9% |
| Science | 70119 | 7% | 33125 | 7% | 7362 | 7% | 10559 | 8% | 19073 | 6% |
| Social Science | 70119 | 6% | 33125 | 8% | 7362 | 5% | 10559 | 4% | 19073 | 4% |
| Entry Cohort | | | | | | | | | | |
| cohort_2018 | 120841 | 12% | 54180 | 12% | 13840 | 15% | 18665 | 13% | 34156 | 11% |
| cohort_2019 | 120841 | 12% | 54180 | 12% | 13840 | 14% | 18665 | 13% | 34156 | 12% |
| cohort_2020 | 120841 | 13% | 54180 | 13% | 13840 | 14% | 18665 | 13% | 34156 | 13% |
| cohort_2021 | 120841 | 9% | 54180 | 11% | 13840 | 8% | 18665 | 10% | 34156 | 6% |
| cohort_2022 | 120841 | 15% | 54180 | 18% | 13840 | 12% | 18665 | 15% | 34156 | 10% |
| cohort_2023 | 120841 | 14% | 54180 | 13% | 13840 | 12% | 18665 | 13% | 34156 | 16% |
| cohort_2024 | 120841 | 13% | 54180 | 11% | 13840 | 12% | 18665 | 13% | 34156 | 17% |
| cohort_2025 | 120841 | 12% | 54180 | 10% | 13840 | 12% | 18665 | 11% | 34156 | 14% |
| School Size | | | | | | | | | | |
| Very small | 119355 | 3% | 53549 | 3% | 13663 | 4% | 18448 | 3% | 33695 | 4% |
| Small | 119355 | 17% | 53549 | 15% | 13663 | 20% | 18448 | 17% | 33695 | 18% |
| Medium | 119355 | 53% | 53549 | 53% | 13663 | 51% | 18448 | 52% | 33695 | 55% |
| Medium large | 119355 | 17% | 53549 | 18% | 13663 | 16% | 18448 | 18% | 33695 | 15% |
| Large | 119355 | 10% | 53549 | 11% | 13663 | 9% | 18448 | 10% | 33695 | 8% |

**Table A2.** *Descriptive Statistics by Entry Pathway: cohorts 2017-18 to 2019-20*

| | Overall | | Student teaching | | Prelim Out-of-State | | Intern | | Emergency | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | N | Percent | N | Percent | N | Percent |
| Race/Ethnicity | | | | | | | | | | |
| Asian American | 41140 | 0.09 | 18126 | 0.10 | 5355 | 0.10 | 6425 | 0.08 | 11234 | 0.06 |
| Black/African American | 41140 | 0.05 | 18126 | 0.02 | 5355 | 0.07 | 6425 | 0.05 | 11234 | 0.08 |
| White | 41140 | 0.55 | 18126 | 0.57 | 5355 | 0.67 | 6425 | 0.52 | 11234 | 0.46 |
| Hispanic/Latino | 41140 | 0.29 | 18126 | 0.27 | 5355 | 0.13 | 6425 | 0.32 | 11234 | 0.37 |
| Multiracial/other | 41140 | 0.03 | 18126 | 0.03 | 5355 | 0.03 | 6425 | 0.03 | 11234 | 0.03 |
| Gender | | | | | | | | | | |
| Female | 43028 | 0.73 | 18895 | 0.75 | 5635 | 0.78 | 6740 | 0.69 | 11758 | 0.70 |
| Male | 43028 | 0.27 | 18895 | 0.25 | 5635 | 0.22 | 6740 | 0.31 | 11758 | 0.30 |
| Age | | | | | | | | | | |
| Mean | 40307 | 32.41 | 17907 | 30.93 | 5218 | 35.19 | 6246 | 32.19 | 10936 | 33.64 |
| Highest Degree Earned | | | | | | | | | | |
| BA | 40298 | 0.57 | 17901 | 0.43 | 5216 | 0.49 | 6245 | 0.74 | 10936 | 0.76 |
| BA plus 30 | 40298 | 0.21 | 17901 | 0.31 | 5216 | 0.10 | 6245 | 0.14 | 10936 | 0.12 |
| Doctorate | 40298 | 0.01 | 17901 | 0.00 | 5216 | 0.01 | 6245 | 0.01 | 10936 | 0.01 |
| Master | 40298 | 0.18 | 17901 | 0.21 | 5216 | 0.33 | 6245 | 0.10 | 10936 | 0.09 |
| Master plus 30 | 40298 | 0.04 | 17901 | 0.05 | 5216 | 0.07 | 6245 | 0.02 | 10936 | 0.02 |
| Credential Type | | | | | | | | | | |
| Multiple Subject | 41153 | 0.44 | 18561 | 0.50 | 4942 | 0.50 | 6406 | 0.31 | 11244 | 0.39 |
| Single Subject | 41153 | 0.40 | 18561 | 0.45 | 4942 | 0.49 | 6406 | 0.35 | 11244 | 0.30 |
| Education Specialist | 41153 | 0.16 | 18561 | 0.05 | 4942 | 0.01 | 6406 | 0.34 | 11244 | 0.31 |
| School Level | | | | | | | | | | |
| Elementary | 42023 | 0.47 | 18452 | 0.49 | 5524 | 0.45 | 6572 | 0.42 | 11475 | 0.47 |
| Elem.-High Combination | 42023 | 0.07 | 18452 | 0.06 | 5524 | 0.10 | 6572 | 0.08 | 11475 | 0.08 |
| High School | 42023 | 0.27 | 18452 | 0.27 | 5524 | 0.26 | 6572 | 0.29 | 11475 | 0.26 |
| Intermediate/Middle/Jr. High | 42023 | 0.19 | 18452 | 0.18 | 5524 | 0.19 | 6572 | 0.20 | 11475 | 0.19 |
| District Locale | | | | | | | | | | |
| City | 43154 | 0.50 | 18827 | 0.48 | 5685 | 0.50 | 6741 | 0.55 | 11901 | 0.51 |
| Suburban | 43154 | 0.39 | 18827 | 0.45 | 5685 | 0.37 | 6741 | 0.36 | 11901 | 0.33 |
| Rural | 43154 | 0.11 | 18827 | 0.08 | 5685 | 0.12 | 6741 | 0.09 | 11901 | 0.16 |
| Charter School | | | | | | | | | | |
| Non-charter | 42023 | 0.80 | 18452 | 0.83 | 5524 | 0.69 | 6572 | 0.74 | 11475 | 0.84 |
| Charter | 42023 | 0.20 | 18452 | 0.17 | 5524 | 0.31 | 6572 | 0.26 | 11475 | 0.16 |
| UPC Quartile | | | | | | | | | | |
| Q1 lowest | 42854 | 0.22 | 18740 | 0.27 | 5685 | 0.29 | 6704 | 0.16 | 11725 | 0.14 |
| Q2 | 42854 | 0.25 | 18740 | 0.26 | 5685 | 0.27 | 6704 | 0.23 | 11725 | 0.23 |
| Q3 | 42854 | 0.26 | 18740 | 0.24 | 5685 | 0.23 | 6704 | 0.28 | 11725 | 0.31 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Q4 highest | 42854 | 0.27 | 18740 | 0.24 | 5685 | 0.21 | 6704 | 0.33 | 11725 | 0.31 |
| Chronic Absence Rate | 28051 | 13.72 | 12220 | 12.30 | 3872 | 13.72 | 4509 | 14.49 | 7450 | 15.59 |
| Suspension Rate | 42817 | 3.62 | 18727 | 3.21 | 5648 | 3.56 | 6711 | 3.89 | 11731 | 4.15 |
| Entry Cohort | | | | | | | | | | |
| cohort_1 | 43486 | 0.33 | 18967 | 0.32 | 5768 | 0.35 | 6811 | 0.33 | 11940 | 0.31 |
| cohort_2 | 43486 | 0.33 | 18967 | 0.33 | 5768 | 0.33 | 6811 | 0.34 | 11940 | 0.32 |
| cohort_3 | 43486 | 0.34 | 18967 | 0.35 | 5768 | 0.31 | 6811 | 0.33 | 11940 | 0.36 |
| School Size | | | | | | | | | | |
| Very small | 42854 | 0.04 | 18740 | 0.03 | 5685 | 0.04 | 6704 | 0.04 | 11725 | 0.04 |
| Small | 42854 | 0.15 | 18740 | 0.13 | 5685 | 0.19 | 6704 | 0.16 | 11725 | 0.16 |
| Medium | 42854 | 0.54 | 18740 | 0.53 | 5685 | 0.50 | 6704 | 0.53 | 11725 | 0.56 |
| Medium large | 42854 | 0.17 | 18740 | 0.19 | 5685 | 0.17 | 6704 | 0.18 | 11725 | 0.15 |
| Large | 42854 | 0.10 | 18740 | 0.12 | 5685 | 0.10 | 6704 | 0.10 | 11725 | 0.08 |

**Table A3.** *One-Year Multinomial Logit Estimates of Teacher Moving and Leaving: cohorts 2017-18 to 2023-24*

| | M1 pathway | | M2 teacher | | M3 teacher & school context | |
|---|---|---|---|---|---|---|
| | Mover | Leaver | Mover | Leaver | Mover | Leaver |
| Entry pathway (Omitted: Student teaching) | | | | | | |
| Intern | 0.911 ** | 1.113 ** | 0.910 ** | 1.018 | 0.898 ** | 1.098 * |
| | 0.00 | 0.00 | 0.00 | 0.62 | 0.00 | 0.03 |
| Emergency permit | 0.904 ** | 2.458 ** | 0.876 ** | 2.182 ** | 0.871 ** | 2.642 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Preliminary (out-of-state) | 0.936 * | 2.239 ** | 0.873 ** | 1.928 ** | 0.896 ** | 2.080 ** |
| | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Entry cohort (first observed year) | | | | | | |
| 2019 | 1.106 * | 0.871 ** | 1.120 * | 0.866 ** | 1.031 | 0.784 ** |
| | 0.02 | 0.00 | 0.01 | 0.00 | 0.42 | 0.00 |
| 2020 | 1.079 | 0.826 ** | 1.066 | 0.850 ** | | |
| | 0.08 | 0.00 | 0.16 | 0.00 | | |
| 2021 | 1.115 ** | 0.641 ** | 1.112 ** | 0.658 ** | 1.148 ** | 0.613 ** |
| | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| 2022 | 1.266 ** | 0.881 ** | 1.274 ** | 0.903 * | 1.257 ** | 0.832 ** |
| | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| 2023 | 1.005 | 0.763 ** | 1.013 | 0.766 ** | 1.000 | 0.724 ** |
| | 0.88 | 0.00 | 0.72 | 0.00 | 1.00 | 0.00 |
| 2024 | 1.053 | 0.824 ** | 1.082 * | 0.839 ** | 1.038 | 0.806 ** |
| | 0.14 | 0.00 | 0.04 | 0.00 | 0.36 | 0.00 |
| Staff gender | | | | | | |
| Female | | | 0.985 | 0.849 ** | 0.934 ** | 0.885 ** |
| | | | 0.45 | 0.00 | 0.00 | 0.00 |
| Staff race/ethnicity | | | | | | |
| Asian American | | | 0.980 | 1.096 * | 1.024 | 1.181 ** |
| | | | 0.53 | 0.01 | 0.52 | 0.00 |
| Black/African American | | | 0.994 | 1.221 ** | 0.974 | 1.099 |
| | | | 0.89 | 0.00 | 0.62 | 0.09 |
| Hispanic/Latino | | | 0.931 ** | 0.886 ** | 0.929 ** | 0.840 ** |
| | | | 0.00 | 0.00 | 0.00 | 0.00 |
| Multiracial/Other | | | 1.002 | 0.994 | 0.901 | 0.947 |
| | | | 0.96 | 0.92 | 0.10 | 0.46 |
| Age#age | | | 1.000 | 1.001 ** | 1.000 * | 1.001 ** |
| | | | 0.43 | 0.00 | 0.04 | 0.00 |
| Staff highest degree earned | | | | | | |
| Associates | | | 1.085 | 1.676 ** | 0.821 | 1.295 |
| | | | 0.47 | 0.00 | 0.17 | 0.05 |
| Baccalaureate Plus 30 | | | 1.046 | 0.888 ** | 1.056 | 0.977 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0.09 | | 0.00 | 0.06 | | 0.53 | |
| Doctorate | 0.920 | | 1.067 | 1.087 | | 1.134 | |
| | 0.51 | | 0.61 | 0.55 | | 0.39 | |
| Fifth Year | 1.165 | | 1.134 | 1.418 | | 1.516 | |
| | 0.45 | | 0.61 | 0.13 | | 0.09 | |
| Master | 1.012 | | 0.952 | 1.071 | * | 1.016 | |
| | 0.64 | | 0.10 | 0.02 | | 0.64 | |
| None | 1.509 | ** | 1.549 | ** 1.451 | ** | 1.351 | ** |
| | 0.00 | | 0.01 | 0.00 | | 0.00 | |
| Special | 1.367 | | 1.369 | 1.729 | * | 1.989 | ** |
| | 0.13 | | 0.22 | 0.02 | | 0.01 | |
| Fifth Year within BA | 2.181 | ** | 1.260 | 2.340 | ** | 1.642 | |
| | 0.00 | | 0.45 | 0.00 | | 0.15 | |
| Master Plus 30 | 1.187 | ** | 0.895 | 1.228 | ** | 1.042 | |
| | 0.00 | | 0.07 | 0.00 | | 0.57 | |
| Fifth Year Induction | 1.353 | | 0.325 | 1.814 | | 0.451 | |
| | 0.48 | | 0.29 | 0.18 | | 0.46 | |
| Age | 1.004 | | 0.977 | ** 0.991 | | 0.964 | ** |
| | 0.55 | | 0.00 | 0.28 | | 0.00 | |
| Credential type group (MS/SS/ES) | | | | | | | |
| Single Subject | | | | 1.021 | | 1.174 | ** |
| | | | | 0.59 | | 0.00 | |
| Education Specialist | | | | 1.040 | | 1.001 | |
| | | | | 0.30 | | 0.98 | |
| School level | | | | | | | |
| Elementary-High Combination | | | | 1.062 | | 0.897 | |
| | | | | 0.44 | | 0.08 | |
| High School | | | | 0.680 | ** | 0.738 | ** |
| | | | | 0.00 | | 0.00 | |
| Intermediate/Middle/Junior High | | | | 0.944 | | 0.975 | |
| | | | | 0.18 | | 0.55 | |
| District locale recoded to 3 categories | | | | | | | |
| Suburban | | | | 1.067 | * | 0.993 | |
| | | | | 0.02 | | 0.81 | |
| Rural | | | | 0.977 | | 0.994 | |
| | | | | 0.59 | | 0.88 | |
| Charter indicator | | | | | | | |
| 1 | | | | 0.799 | ** | 1.268 | ** |
| | | | | 0.00 | | 0.00 | |
| upc (quartile) | | | | | | | |
| 2 | | | | 0.951 | | 0.925 | |
| | | | | 0.16 | | 0.05 | |
| 3 | | | | 0.989 | | 0.912 | * |
| | | | | 0.76 | | 0.03 | |
| 4 | | | | 0.901 | ** | 0.931 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.01 | | 0.09 | |
| Chronic absence rate | | | | | | | | | 1.000 | | 1.003 | * |
| | | | | | | | | | 0.72 | | 0.02 | |
| Suspension Rate (Total) | | | | | | | | | 1.013 | ** | 1.005 | |
| | | | | | | | | | 0.00 | | 0.17 | |
| Intercept | 0.238 | ** | 0.145 | ** | 0.201 | ** | 0.190 | ** | 0.287 | ** | 0.210 | ** |
| | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| Number of observations | 106419 | | | | 95919 | | | | 74825 | | | |
| AIC | 171720.59 | | | | 153797.69 | | | | 115297.07 | | | |
| BIC | 171912.10 | | | | 154309.14 | | | | 116016.46 | | | |

** p<.01, * p<.05

Notes: Estimates are relative risk ratios from multinomial logit models predicting 1-year mobility (Mover) and attrition (Leaver), relative to remaining (Stayer). Entry pathway reference category is student teaching. M1 includes pathway only; M2 adds teacher characteristics; M3 adds school context controls. Standard errors clustered at the teacher level.

**Table A4.** *Five-Year Multinomial Logit Estimates of Teacher Moving and Leaving: cohorts 2017-18 to 2019-20*

| | M1 pathway | | M2 teacher | | M3 teacher & school context | |
|---|---|---|---|---|---|---|
| | Mover | Leaver | Mover | Leaver | Mover | Leaver |
| Years since entry (t) | | | | | | |
| 2 | 0.732 ** | 0.622 ** | 2.407 * | 10.382 ** | 3.548 * | 19.649 ** |
| | 0.00 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 |
| 3 | 0.508 ** | 0.338 ** | 0.787 | 13.444 ** | 0.388 | 24.567 ** |
| | 0.00 | 0.00 | 0.58 | 0.00 | 0.13 | 0.00 |
| 4 | 0.441 ** | 0.367 ** | 1.790 | 11.557 ** | 0.933 | 13.864 ** |
| | 0.00 | 0.00 | 0.22 | 0.00 | 0.92 | 0.00 |
| 5 | 0.509 ** | 0.615 ** | 2.039 | 12.595 ** | 1.864 | 3.403 |
| | 0.00 | 0.00 | 0.18 | 0.00 | 0.40 | 0.12 |
| Entry pathway (Omitted: Student teaching) | | | | | | |
| Intern | 0.960 | 1.077 | 0.982 | 0.981 | 0.973 | 0.932 |
| | 0.28 | 0.12 | 0.64 | 0.70 | 0.62 | 0.31 |
| Emergency permit | 0.887 ** | 2.196 ** | 0.893 ** | 1.891 ** | 0.915 | 1.826 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 |
| Preliminary (out-of-state) | 0.996 | 2.247 ** | 0.973 | 1.917 ** | 0.953 | 1.687 ** |
| | 0.92 | 0.00 | 0.54 | 0.00 | 0.44 | 0.00 |
| Entry cohort (first observed year) | | | | | | |
| 2019 | 1.097 ** | 0.868 ** | 1.113 ** | 0.844 ** | 1.057 | 0.982 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.21 | 0.68 |
| 2020 | 1.086 ** | 0.814 ** | 1.090 * | 0.880 ** | 1.058 | 0.306 ** |
| | 0.01 | 0.00 | 0.01 | 0.00 | 0.21 | 0.00 |
| t # Entry pathway | | | | | | |
| 2 # Intern | 1.128 | 1.567 ** | 1.163 * | 1.559 ** | 1.114 | 1.448 ** |
| | 0.05 | 0.00 | 0.02 | 0.00 | 0.24 | 0.00 |
| 2 # Emergency permit | 1.152 ** | 1.013 | 1.182 ** | 1.147 * | 1.133 | 1.084 |
| | 0.01 | 0.83 | 0.01 | 0.04 | 0.13 | 0.39 |
| 2 # Preliminary (out-of-state) | 1.053 | 1.323 ** | 1.051 | 1.493 ** | 1.067 | 1.484 ** |
| | 0.47 | 0.00 | 0.51 | 0.00 | 0.54 | 0.00 |
| 3 # Intern | 1.148 * | 1.286 ** | 1.200 * | 1.395 ** | 1.159 | 1.462 ** |
| | 0.05 | 0.00 | 0.01 | 0.00 | 0.15 | 0.00 |
| 3 # Emergency permit | 1.126 | 0.579 ** | 1.173 * | 0.720 ** | 1.055 | 0.771 * |
| | 0.05 | 0.00 | 0.02 | 0.00 | 0.56 | 0.02 |
| 3 # Preliminary (out-of-state) | 0.868 | 1.228 * | 0.890 | 1.412 ** | 0.912 | 1.535 ** |
| | 0.10 | 0.01 | 0.21 | 0.00 | 0.48 | 0.00 |
| 4 # Intern | 1.478 ** | 1.379 ** | 1.507 ** | 1.663 ** | 1.323 * | 1.363 * |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 |
| 4 # Emergency permit | 1.428 ** | 0.502 ** | 1.506 ** | 0.633 ** | 1.360 ** | 0.571 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 # Preliminary (out-of-state) | 1.025 | 1.075 | 1.081 | 1.430 ** | 1.039 | 1.366 * |
| | 0.80 | 0.43 | 0.44 | 0.00 | 0.79 | 0.03 |
| 5 # Intern | 1.472 ** | 1.065 | 1.514 ** | 1.195 | 1.262 | 1.047 |
| | 0.00 | 0.54 | 0.00 | 0.13 | 0.05 | 0.75 |
| 5 # Emergency permit | 1.358 ** | 0.443 ** | 1.412 ** | 0.584 ** | 1.180 | 0.488 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 |
| 5 # Preliminary (out-of-state) | 0.946 | 0.984 | 1.028 | 1.314 * | 1.031 | 1.123 |
| | 0.61 | 0.87 | 0.81 | 0.01 | 0.85 | 0.43 |
| t # Entry cohort (first observed year) | | | | | | |
| 2 # 2019 | 0.811 ** | 0.939 | 0.813 ** | 0.963 | 0.882 | 0.465 ** |
| | 0.00 | 0.28 | 0.00 | 0.55 | 0.09 | 0.00 |
| 2 # 2020 | 0.811 ** | 0.835 ** | 0.835 ** | 0.784 ** | 0.870 | 1.461 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 |
| 3 # 2019 | 0.909 | 1.534 ** | 0.894 | 1.487 ** | 0.936 | 1.363 ** |
| | 0.13 | 0.00 | 0.09 | 0.00 | 0.45 | 0.00 |
| 3 # 2020 | 1.208 ** | 2.297 ** | 1.228 ** | 2.089 ** | 1.197 * | 7.320 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 |
| 4 # 2019 | 1.029 | 1.746 ** | 1.032 | 1.745 ** | 1.054 | 1.543 ** |
| | 0.67 | 0.00 | 0.65 | 0.00 | 0.56 | 0.00 |
| 4 # 2020 | 0.940 | 1.335 ** | 0.938 | 1.220 * | 0.872 | 3.599 ** |
| | 0.36 | 0.00 | 0.36 | 0.02 | 0.14 | 0.00 |
| 5 # 2019 | 0.813 ** | 0.736 ** | 0.792 ** | 0.748 ** | 0.921 | 0.600 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.00 |
| 5 # 2020 | 0.775 ** | 0.942 | 0.763 ** | 0.905 | 0.798 * | 2.614 ** |
| | 0.00 | 0.46 | 0.00 | 0.25 | 0.03 | 0.00 |
| Staff gender | | | | | | |
| Female | | | 0.976 | 0.828 ** | 0.916 * | 0.856 ** |
| | | | 0.43 | 0.00 | 0.04 | 0.00 |
| Staff race/ethnicity | | | | | | |
| Asian American | | | 0.971 | 1.002 | 1.003 | 1.097 |
| | | | 0.56 | 0.97 | 0.96 | 0.24 |
| Black/African American | | | 0.962 | 1.273 ** | 0.895 | 1.208 * |
| | | | 0.57 | 0.00 | 0.25 | 0.04 |
| Hispanic/Latino | | | 0.966 | 0.907 ** | 0.995 | 0.926 |
| | | | 0.28 | 0.01 | 0.91 | 0.13 |
| Multiracial | | | 1.094 | 0.923 | 1.138 | 0.823 |
| | | | 0.28 | 0.43 | 0.24 | 0.17 |
| Age#age | | | 1.000 | 1.001 ** | 1.000 | 1.001 ** |
| | | | 0.91 | 0.00 | 0.49 | 0.00 |
| Staff highest degree earned | | | | | | |
| Baccalaureate Plus 30 | | | 1.165 ** | 0.815 ** | 1.183 ** | 0.861 ** |
| | | | 0.00 | 0.00 | 0.00 | 0.01 |
| Doctorate | | | 1.194 | 0.942 | 1.338 | 0.929 |
| | | | 0.29 | 0.74 | 0.18 | 0.77 |

| | | | | |
|---|---|---|---|---|
| Master | 1.178 ** | 0.907 * | 1.206 ** | 0.924 |
| | 0.00 | 0.01 | 0.00 | 0.15 |
| Master Plus 30 | 1.276 ** | 0.814 ** | 1.213 * | 0.975 |
| | 0.00 | 0.00 | 0.02 | 0.79 |
| t # Staff gender | | | | |
| 2 # Female | 1.046 | 1.115 | 1.035 | 1.174 |
| | 0.39 | 0.06 | 0.63 | 0.05 |
| 3 # Female | 1.112 | 1.321 ** | 1.099 | 1.343 ** |
| | 0.07 | 0.00 | 0.25 | 0.00 |
| 4 # Female | 1.060 | 1.461 ** | 1.044 | 1.424 ** |
| | 0.36 | 0.00 | 0.62 | 0.00 |
| 5 # Female | 1.177 * | 1.547 ** | 1.162 | 1.608 ** |
| | 0.02 | 0.00 | 0.13 | 0.00 |
| t # Staff race/ethnicity | | | | |
| 2 # Asian American | 0.984 | 0.860 | 0.978 | 0.761 * |
| | 0.85 | 0.13 | 0.84 | 0.04 |
| 2 # Black/African American | 1.305 * | 1.280 * | 1.433 * | 1.230 |
| | 0.01 | 0.02 | 0.02 | 0.18 |
| 2 # Hispanic/Latino | 0.829 ** | 0.815 ** | 0.818 ** | 0.759 ** |
| | 0.00 | 0.00 | 0.01 | 0.00 |
| 2 # Multiracial | 0.782 | 0.921 | 0.745 | 1.042 |
| | 0.09 | 0.64 | 0.13 | 0.86 |
| 3 # Asian American | 0.913 | 0.883 | 0.854 | 0.759 |
| | 0.34 | 0.26 | 0.23 | 0.07 |
| 3 # Black/African American | 1.344 * | 1.108 | 1.435 * | 0.997 |
| | 0.02 | 0.45 | 0.04 | 0.99 |
| 3 # Hispanic/Latino | 0.926 | 0.623 ** | 0.919 | 0.598 ** |
| | 0.20 | 0.00 | 0.31 | 0.00 |
| 3 # Multiracial | 0.843 | 1.195 | 0.935 | 1.250 |
| | 0.30 | 0.34 | 0.75 | 0.40 |
| 4 # Asian American | 1.070 | 1.081 | 1.105 | 1.051 |
| | 0.51 | 0.52 | 0.47 | 0.76 |
| 4 # Black/African American | 1.254 | 1.075 | 1.103 | 1.253 |
| | 0.11 | 0.66 | 0.63 | 0.29 |
| 4 # Hispanic/Latino | 1.012 | 0.810 * | 1.018 | 0.842 |
| | 0.86 | 0.01 | 0.84 | 0.13 |
| 4 # Multiracial | 1.168 | 1.060 | 1.404 | 1.079 |
| | 0.35 | 0.79 | 0.10 | 0.81 |
| 5 # Asian American | 0.780 * | 1.143 | 0.852 | 0.927 |
| | 0.04 | 0.27 | 0.31 | 0.64 |
| 5 # Black/African American | 1.412 * | 0.807 | 1.159 | 0.737 |
| | 0.02 | 0.27 | 0.49 | 0.23 |
| 5 # Hispanic/Latino | 0.949 | 0.657 ** | 0.841 | 0.658 ** |
| | 0.45 | 0.00 | 0.07 | 0.00 |
| 5 # Multiracial | 0.984 | 1.062 | 0.930 | 1.226 |

| | | | | |
|---|---|---|---|---|
| | 0.93 | 0.79 | 0.78 | 0.50 |
| t # Age | | | | |
| 2 | 0.946 ** | 0.886 ** | 0.927 ** | 0.852 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 0.992 | 0.854 ** | 1.028 | 0.808 ** |
| | 0.72 | 0.00 | 0.40 | 0.00 |
| 4 | 0.943 * | 0.859 ** | 0.965 | 0.832 ** |
| | 0.02 | 0.00 | 0.30 | 0.00 |
| 5 | 0.949 | 0.875 ** | 0.938 | 0.909 * |
| | 0.06 | 0.00 | 0.09 | 0.02 |
| t # Age#age | | | | |
| 2 | 1.001 * | 1.001 ** | 1.001 * | 1.002 ** |
| | 0.01 | 0.00 | 0.01 | 0.00 |
| 3 | 1.000 | 1.001 ** | 0.999 | 1.002 ** |
| | 0.54 | 0.00 | 0.12 | 0.00 |
| 4 | 1.000 | 1.001 ** | 1.000 | 1.001 ** |
| | 0.13 | 0.00 | 0.80 | 0.00 |
| 5 | 1.000 | 1.001 ** | 1.000 | 1.001 |
| | 0.39 | 0.01 | 0.46 | 0.27 |
| t # Staff highest degree earned | | | | |
| 2 # Baccalaureate Plus 30 | 0.957 | 0.930 | 0.950 | 0.938 |
| | 0.47 | 0.32 | 0.52 | 0.51 |
| 2 # Doctorate | 0.864 | 0.840 | 0.884 | 0.789 |
| | 0.61 | 0.60 | 0.75 | 0.60 |
| 2 # Master | 0.979 | 0.921 | 1.021 | 1.024 |
| | 0.72 | 0.23 | 0.79 | 0.80 |
| 2 # Master Plus 30 | 0.982 | 0.829 | 1.303 * | 0.853 |
| | 0.85 | 0.16 | 0.04 | 0.38 |
| 3 # Baccalaureate Plus 30 | 0.934 | 0.931 | 1.031 | 0.920 |
| | 0.32 | 0.41 | 0.73 | 0.48 |
| 3 # Doctorate | 1.746 | 1.100 | 1.461 | 1.195 |
| | 0.06 | 0.82 | 0.35 | 0.76 |
| 3 # Master | 1.022 | 0.961 | 0.952 | 0.902 |
| | 0.75 | 0.62 | 0.58 | 0.35 |
| 3 # Master Plus 30 | 0.942 | 0.849 | 1.053 | 0.891 |
| | 0.60 | 0.29 | 0.74 | 0.57 |
| 4 # Baccalaureate Plus 30 | 0.863 * | 0.942 | 0.847 | 1.052 |
| | 0.05 | 0.54 | 0.09 | 0.68 |
| 4 # Doctorate | 0.929 | 1.241 | 0.450 | 1.049 |
| | 0.85 | 0.64 | 0.21 | 0.94 |
| 4 # Master | 1.073 | 1.068 | 1.053 | 1.160 |
| | 0.33 | 0.46 | 0.59 | 0.20 |
| 4 # Master Plus 30 | 0.861 | 0.897 | 1.069 | 1.052 |
| | 0.23 | 0.52 | 0.69 | 0.82 |
| 5 # Baccalaureate Plus 30 | 0.818 * | 1.141 | 0.807 * | 1.171 |

| | | | | |
|---|---|---|---|---|
| | 0.01 | 0.18 | 0.05 | 0.21 |
| 5 # Doctorate | 0.923 | 4.009 ** | 1.214 | 3.734 ** |
| | 0.85 | 0.00 | 0.72 | 0.00 |
| 5 # Master | 0.951 | 1.000 | 0.912 | 1.061 |
| | 0.53 | 1.00 | 0.38 | 0.63 |
| 5 # Master Plus 30 | 0.804 | 1.123 | 0.755 | 1.172 |
| | 0.11 | 0.49 | 0.17 | 0.46 |
| Age | 1.011 | 0.942 ** | 1.000 | 0.971 |
| | 0.32 | 0.00 | 0.99 | 0.07 |
| Credential type group (MS/SS/ES) | | | | |
| Single Subject | | | 1.015 | 1.050 |
| | | | 0.80 | 0.45 |
| Education Specialist | | | 1.000 | 0.864 * |
| | | | 1.00 | 0.03 |
| School level | | | | |
| Elementary-High Combination | | | 1.154 | 0.934 |
| | | | 0.06 | 0.44 |
| High School | | | 0.834 ** | 0.724 ** |
| | | | 0.01 | 0.00 |
| Intermediate/Middle/Junior High | | | 0.955 | 0.835 ** |
| | | | 0.47 | 0.01 |
| District locale recoded to 3 categories | | | | |
| Suburban | | | 1.072 | 0.861 ** |
| | | | 0.08 | 0.00 |
| Rural | | | 1.083 | 0.926 |
| | | | 0.20 | 0.26 |
| Charter indicator | | | | |
| 1 | | | 0.888 * | 1.198 ** |
| | | | 0.02 | 0.00 |
| upc_q | | | | |
| 2 | | | 0.908 | 0.964 |
| | | | 0.06 | 0.55 |
| 3 | | | 0.920 | 0.970 |
| | | | 0.13 | 0.63 |
| 4 | | | 0.832 ** | 0.955 |
| | | | 0.00 | 0.50 |
| t # Credential type group (MS/SS/ES) | | | | |
| 2 # Single Subject | | | 1.072 | 1.011 |
| | | | 0.51 | 0.92 |
| 2 # Education Specialist | | | 1.137 | 1.279 * |
| | | | 0.19 | 0.03 |
| 3 # Single Subject | | | 0.967 | 0.890 |

| | | |
|---|---|---|
| | 0.78 | 0.38 |
| 3 # Education Specialist | 1.251 * | 1.265 |
| | 0.05 | 0.09 |
| 4 # Single Subject | 0.912 | 1.006 |
| | 0.46 | 0.97 |
| 4 # Education Specialist | 1.170 | 1.826 ** |
| | 0.19 | 0.00 |
| 5 # Single Subject | 0.875 | 1.106 |
| | 0.34 | 0.51 |
| 5 # Education Specialist | 1.447 ** | 1.635 ** |
| | 0.00 | 0.00 |
| t # School level | | |
| 2 # Elementary-High Combination | 0.743 * | 1.241 |
| | 0.03 | 0.14 |
| 2 # High School | 0.888 | 1.367 ** |
| | 0.28 | 0.01 |
| 2 # Intermediate/Middle/Junior High | 0.885 | 1.128 |
| | 0.26 | 0.31 |
| 3 # Elementary-High Combination | 0.923 | 1.411 * |
| | 0.59 | 0.04 |
| 3 # High School | 1.138 | 1.426 * |
| | 0.29 | 0.02 |
| 3 # Intermediate/Middle/Junior High | 0.915 | 1.246 |
| | 0.47 | 0.13 |
| 4 # Elementary-High Combination | 0.838 | 0.890 |
| | 0.28 | 0.55 |
| 4 # High School | 1.041 | 1.300 |
| | 0.76 | 0.09 |
| 4 # Intermediate/Middle/Junior High | 1.131 | 0.942 |
| | 0.33 | 0.70 |
| 5 # Elementary-High Combination | 0.710 | 0.933 |
| | 0.07 | 0.74 |
| 5 # High School | 0.866 | 1.434 * |
| | 0.33 | 0.03 |
| 5 # Intermediate/Middle/Junior High | 1.207 | 1.227 |
| | 0.17 | 0.21 |

| | | |
|---|---|---|
| t # District locale recoded to 3 categories | | |
| 2 # Suburban | 0.855 * | 1.002 |
| | 0.02 | 0.98 |
| 2 # Rural | 0.868 | 1.399 ** |
| | 0.18 | 0.00 |
| 3 # Suburban | 0.940 | 0.925 |
| | 0.41 | 0.40 |
| 3 # Rural | 0.934 | 1.008 |
| | 0.57 | 0.96 |
| 4 # Suburban | 0.989 | 1.387 ** |
| | 0.89 | 0.00 |
| 4 # Rural | 1.027 | 1.203 |
| | 0.83 | 0.26 |
| 5 # Suburban | 1.025 | 1.270 * |
| | 0.79 | 0.02 |
| 5 # Rural | 1.084 | 1.284 |
| | 0.57 | 0.12 |
| t # Charter indicator | | |
| 2 # 1 | 1.153 | 1.177 |
| | 0.09 | 0.09 |
| 3 # 1 | 1.375 ** | 1.440 ** |
| | 0.00 | 0.00 |
| 4 # 1 | 1.525 ** | 1.875 ** |
| | 0.00 | 0.00 |
| 5 # 1 | 1.569 ** | 1.716 ** |
| | 0.00 | 0.00 |
| t # upc_q | | |
| 2 # 2 | 1.051 | 1.154 |
| | 0.57 | 0.17 |
| 2 # 3 | 1.033 | 1.214 |
| | 0.72 | 0.08 |
| 2 # 4 | 0.963 | 1.314 * |
| | 0.70 | 0.02 |
| 3 # 2 | 1.049 | 1.108 |
| | 0.63 | 0.41 |
| 3 # 3 | 0.932 | 1.182 |
| | 0.51 | 0.19 |
| 3 # 4 | 1.141 | 1.067 |
| | 0.23 | 0.63 |
| 4 # 2 | 1.240 | 0.959 |
| | 0.05 | 0.75 |
| 4 # 3 | 1.126 | 0.932 |
| | 0.31 | 0.61 |
| 4 # 4 | 1.133 | 0.912 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 0.32 | 0.52 |
| 5 # 2 | | | | | 1.252 | 1.130 |
| | | | | | 0.08 | 0.36 |
| 5 # 3 | | | | | 1.484 ** | 0.987 |
| | | | | | 0.00 | 0.93 |
| 5 # 4 | | | | | 1.674 ** | 1.054 |
| | | | | | 0.00 | 0.73 |
| t # Chronic absence rate | | | | | | |
| 2 | | | | | 1.004 | 0.991 ** |
| | | | | | 0.09 | 0.00 |
| 3 | | | | | 0.998 | 0.998 |
| | | | | | 0.50 | 0.52 |
| 4 | | | | | 1.007 * | 1.006 |
| | | | | | 0.02 | 0.10 |
| 5 | | | | | 1.004 | 1.010 ** |
| | | | | | 0.19 | 0.01 |
| t # Suspension Rate (Total) | | | | | | |
| 2 | | | | | 1.003 | 0.981 * |
| | | | | | 0.74 | 0.03 |
| 3 | | | | | 1.009 | 0.942 ** |
| | | | | | 0.38 | 0.00 |
| 4 | | | | | 1.016 | 0.956 ** |
| | | | | | 0.12 | 0.00 |
| 5 | | | | | 1.026 * | 0.953 ** |
| | | | | | 0.02 | 0.00 |
| Chronic absence rate | | | | | 0.999 | 0.992 ** |
| | | | | | 0.70 | 0.00 |
| Suspension Rate (Total) | | | | | 1.000 | 1.053 ** |
| | | | | | 0.95 | 0.00 |
| Intercept | 0.234 ** | 0.149 ** | 0.154 ** | 0.418 ** | 0.218 ** | 0.306 ** |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Number of observations | 133566 | | 121539 | | 70972 | |
| AIC | 180907.52 | | 162163.96 | | 93169.84 | |
| BIC | 181495.66 | | 163814.32 | | 95920.86 | |

** p<.01, * p<.05

Notes: Estimates are relative risk ratios from discrete-time multinomial logit models predicting teacher mobility (Mover) and attrition (Leaver) over the first five years, relative to remaining (Stayer). The reference category for entry pathway is student teaching. Models include year indicators, cohort indicators, and their interactions as specified. M1 includes pathway only; M2 adds teacher characteristics; M3 adds school context controls. Standard errors are clustered at the teacher level.

**Figure A1.** *Unadjusted predicted probabilities of moving from the first school (left) and leaving teaching from public schools in California (right) over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*

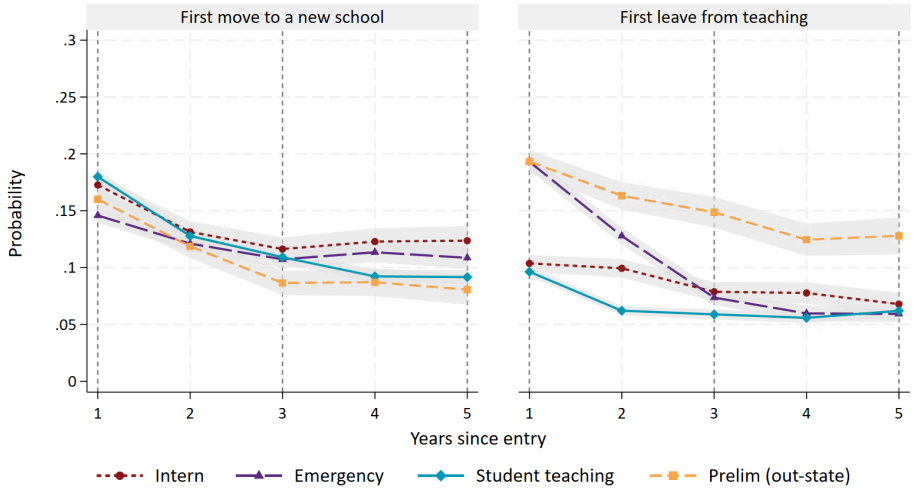


**Figure A2.** *Adjusted (for teacher characteristics) predicted probabilities of moving from the first school (left) and leaving teaching from public schools in California (right) over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*

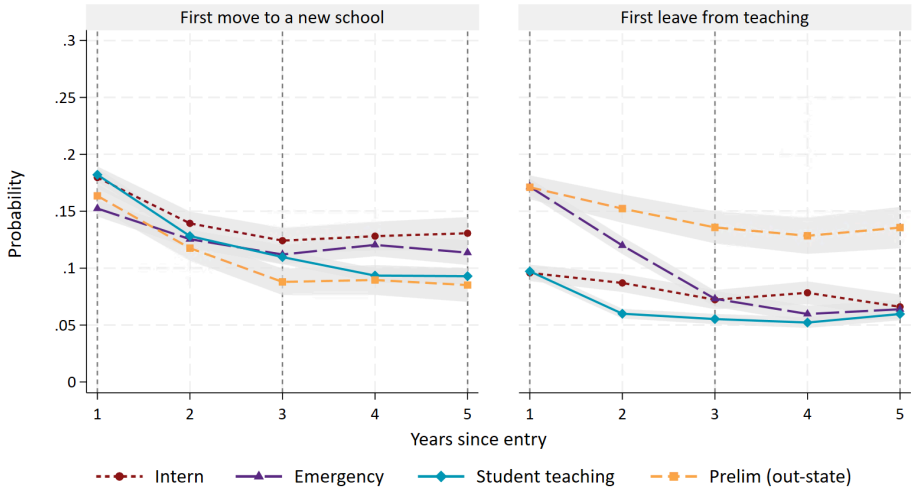

**Figure A3.** *Unadjusted cumulative predicted probabilities of moving from the first school over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*

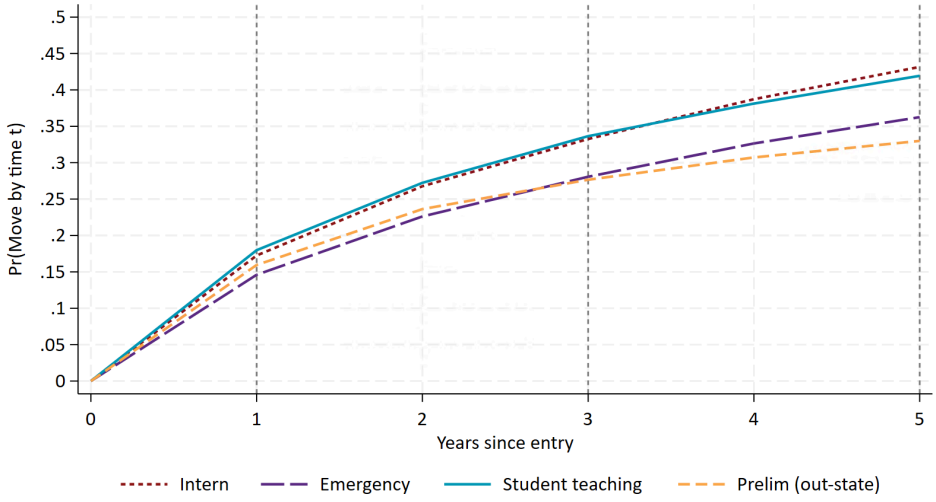


**Figure A4.** *Adjusted (for teacher characteristics) cumulative predicted probabilities of moving from the first school over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*

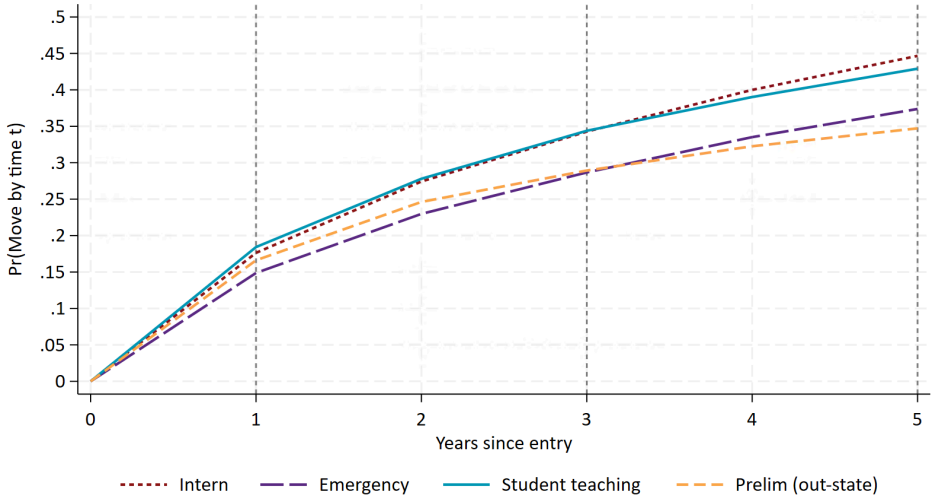

**Figure A5.** *Fully adjusted cumulative predicted probabilities of moving from the first school over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*

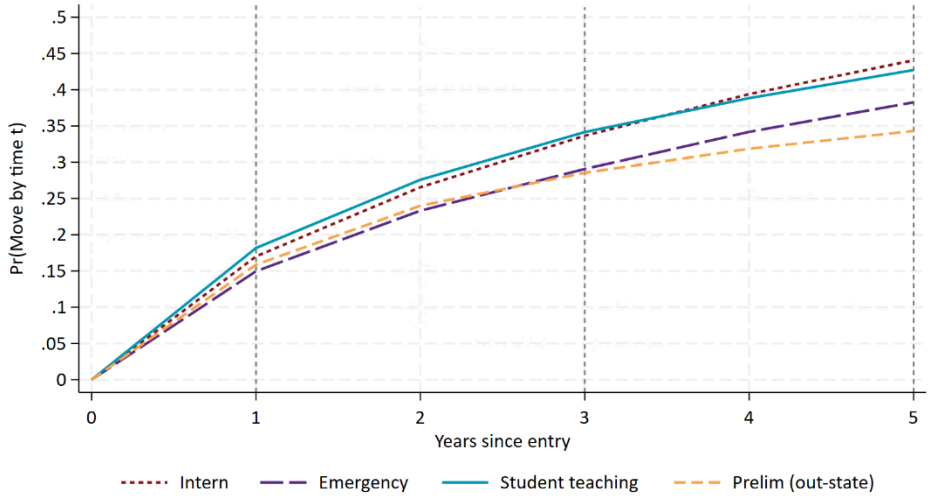


**Figure A6.** *Unadjusted cumulative predicted probabilities of leaving teaching from public schools in California over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*

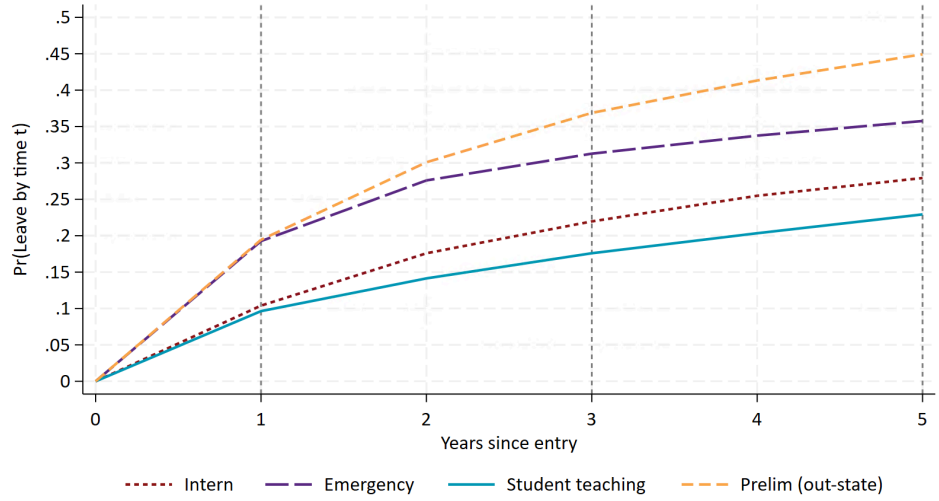

**Figure A7.** *Adjusted (for teacher characteristics) cumulative predicted probabilities of leaving teaching from public schools in California over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*

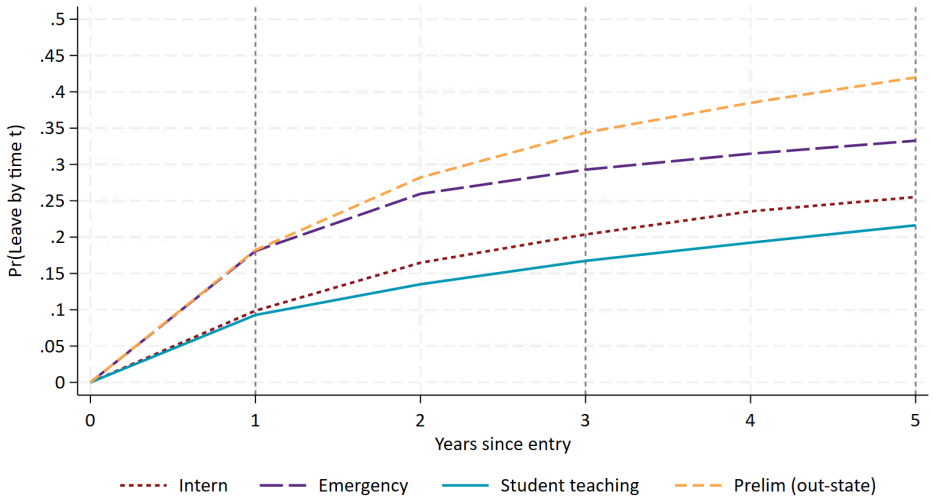


**Figure A8.** *Fully adjusted cumulative predicted probabilities of leaving teaching from public schools in California over the first five years, by entry pathways: cohorts 2017-18 to 2019-20*