Colorado Early Childhood Workforce Data Brief #2

Longitudinal Analysis of Early Childhood Workforce Datasets, 2021–2023

REPORT HIGHLIGHTS:

- The 12-month **retention rate for the center-based early care and education (ECE) workforce was 79%**. It was higher for older workers, for those in more senior roles, and for workers in home-based settings.
- **New child care workers generally skewed younger** than the current workforce.
- The **12-month growth rate f**or the center-based workforce between 2021–2022 and 2022–2023 **was 5%**.
- **8.9%** of active, center-based ECE workers in 2021–2022 were **receiving Supplemental Nutrition Assistance Program (SNAP) benefits** that year and **1.7% were receiving CCCAP**.

AUTHORS:

Emily Wiegand
Senior Researcher, Chapin Hall

Shannon Guiltinan
Researcher, Chapin Hall

Thao Tran
Associate Researcher, Chapin Hall

Christian Denes
Senior Policy Analyst, Chapin Hall

CHAPIN HALL
AT THE UNIVERSITY OF CHICAGO

For inquiries contact: Whitney LeBoeuf | whitney@coloradolab.org | www.ColoradoLab.org
Report Number: 23-02B. Date: May 2024

Table of Contents

Acknowledgements

This work would not be possible without anonymized data provided by the Linked Information Network of Colorado (LINC). The findings do not necessarily reflect the opinions of the Colorado Governor's Office of Information Technology or the organizations contributing data.

Introduction

The Colorado Evaluation & Action Lab (Colorado Lab) has partnered with Chapin Hall to analyze early childhood workforce data with the goal of better understanding the preparation, advancement, and retention experiences of workers. These analyses will inform policies and investments to support early care and education (ECE) professionals. The Linked Information Network of Colorado (LINC) was used to bring together datasets from multiple state agencies in Colorado to inform our understanding of the early childhood workforce.

Key Findings & Recommendations

- **Finding:** The 12-month retention rate for the 2021–2022 cohort workers in centers was 79%, while for those in homes it was 86%. Among center-based staff, the rate was higher for directors (93%) and lead teachers (83%), and lower for assistant teachers (74%).
- **Recommendation:** Implement and track key metrics using refined hire and end dates as described in this brief.
- **Finding:** The 12-month growth rate for the center-based workforce between 2021–2022 and 2022–2023 was 5%; for homes it was -1%.
- **Recommendation:** Track advancement metrics for key roles, (e.g., proportion of assistant teachers promoted to lead and % of lead teacher).
- **Recommendation:** As data become available, develop retention measures specific to new hires.
- **Finding:** In 2021–2022, 8.9% of ECE workers in centers could be matched to SNAP data and 1.7% could be matched to CCCAP. The rates for workers in family child care homes were lower.
- **Recommendation:** Continue to explore ECE workforce eligibility for and take-up of SNAP and CCCAP benefits.

Purpose of This Brief

This brief explores characteristics and employment patterns for ECE workforce in school year 2021–2022. Key questions addressed in the brief include:

1. What patterns of retention, advancement, and growth exist within the ECE workforce?
2. How do those patterns differ across subpopulations?
3. To what extent is the ECE workforce participating in two public benefit programs: the Supplemental Nutrition Assistance Program (SNAP) and Colorado Child Care Assistance Program (CCCAP)?

Methods

The Professional Development Information System (PDIS) data for these analyses were prepared by the LINC team. PDIS data contain workforce characteristics, including demographics, qualifications, and job information such as employer and professional role.

After analyzing data across 2019-2023, we determined that significant differences in the way active employment status was defined before and after 2020–2021 do not allow for accurate tracking of worker history and retention over these four years (the differences are due to a PDIS system redesign and the introduction of a staff verification policy that occurred between 2020–2021). Given the discrepancies over the four-year period, we concentrated on retention, advancement, and growth over the two most recent years of data (2021–2022 and 2022–2023) for this analysis.

Prior work has shown that, due to the inconsistent timing for employment verification among directors, employment status updates in PDIS may be lagged. Entering and exiting employees are inconsistently captured as verified active, verified inactive, or unverified, and some are altogether missing in the year's extract. However, hire and end dates are fairly complete after verification and appear accurate. With this in mind, we incorporated partial data from the 2023-2024 school year and refined each year's employment dates using the hire and end dates from the subsequent year's data extract. Table 1 summarizes how hire and end dates were used to refine employment activity.

Table 1. Refined Hire and End Dates

Employment Status	Refinement Method
Verified Inactive	Leave dates from original extract
Verified Active	Replace end date with end date from next year's extract
Unverified	Replace hire and end dates with hire and end dates from next year's extract

Working with the refined hire and end dates, we identified a cohort of individuals actively employed in 2021–2022. Individuals were considered actively employed during that year if they met any of the following criteria:

- Had a verified active record in the 2021–2022 extract with a hire date before July 1, 2022.
- Had an unverified or verified inactive record in the 2021–2022 extract but their refined hire or end date fell within the 2021–2022 school year.
- Had a verified inactive record in the 2021–2022 extract, but their hire date in the 2022–2023 extract was within the 2021–2022 school year.

Findings

2021–2022 Cohort Overview

> **There were 23,735 individuals actively employed at any point in 2021–2022 in centers and 1,366 employed in family child care homes (FCCH).**

Our 2021–2022 actively employed cohort of individuals contained 23,735 individuals working in centers. As described in Table 2, individuals ages 25-34 and 35-44 represented the largest proportions of the 2021–2022 center-based cohort, making up over 50% of the workforce. Roughly half of the workforce was White and nearly a quarter was Hispanic. Female workers composed 88% of the workforce. Approximately 15% of both center-based and FCCH workers in the 2021-2022 cohort did not report ethnicity.

The family child care home (FCCH) workforce for the same year, which contained 1,366 individuals, was proportionately older, with more than two-thirds age 45 and older. There were also proportionately more White and fewer Hispanic individuals in the FCCH workforce as compared to center-based providers (Table 2).

Table 2. Center-Based and FCCH Workers by Role and Demographic

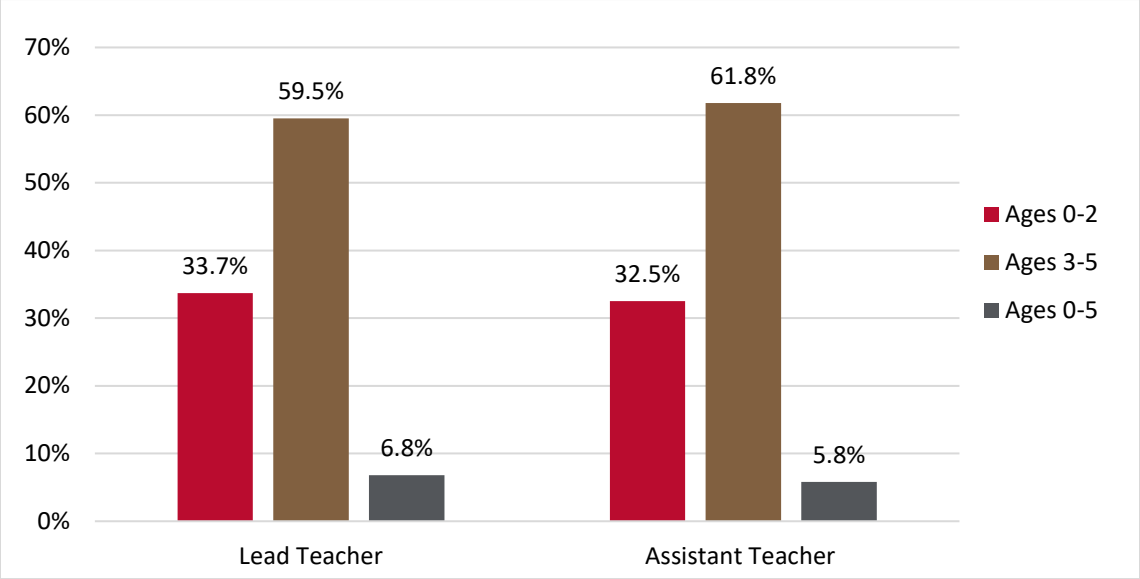
	Center-Based		FCCH	
	N	%	N	%
Total	23,735	-	1,366	-
Role				
Director	1,368	5.8%	-	-
Specialized Leadership	544	2.3%	-	-
Lead Teacher	9,180	38.7%	-	-
Assistant Teacher	7,164	30.2%	-	-
Other	1,295	5.5%	-	-
Role Uknown	4,184	17.6%		
Race/Ethnicity				
White	12,073	50.9%	759	55.6%
Hispanic	5,747	24.2%	240	17.6%
Black or African American	914	3.9%	72	5.3%
Asian	522	2.2%	37	2.7%
Other[i]	862	3.6%	41	3.0%
Missing	3,617	15.2%	217	15.9%
Age Group				
24 and under	2,140	9.0%	36	2.6%
25-34	6,906	29.1%	139	10.2%
35-44	5,427	22.9%	238	17.4%
45-54	4,122	17.4%	317	23.3%
55-64	3,258	13.7%	351	25.7%
Gender				
Female	20,810	87.7%	1,189	87.0%
Male	1,080	4.6%	98	7.2%
Other[ii]	1,845	7.7%	79	5.8%

Figure 1 provides more detail on the ages served by teachers in the center-based cohort. Roughly two-thirds of the 2021–2022 center-based workforce were employed as Lead Teachers and Assistant Teachers. Across both roles, roughly 60% of teachers served children ages 3-5 and one-third served children ages 0-2.

[i] "Multiracial," "Other," "Prefer Not to Answer," "American Indian or Alaskan Native," and "Native Hawaiian or Pacific Islander," are combined as "Other" due to small samples.

[ii] "Missing," "Prefer not to answer" and "Do not identify as male or female" are combined due to small samples.

Figure 1. 2021–2022 Center-Based: By Teacher Role and Ages Served (%) (n=16,204)



Retention

> **The 12-month retention rate, the percentage of the 2021–2022 cohort that is actively employed in 2022–2023, is higher for older workers, for those in more senior roles, and for workers in home-based settings.**

The 12-month retention rate among the 2021–2022 center-based cohort is 79%. This is slightly lower for full-time workers (78%), and higher for part-time workers (92%). As shown in Figure 2, older workers are retained at higher rates than younger workers. The retention rate does not vary significantly by gender or race.

> **Key Metric: 12-Month Retention**
> **79%**

Retention varies significantly by role among center-based workers, with the higher rates among more senior roles (Figure 3). Retention rates were similar for infant/toddler teachers (83% of Lead Teachers and 72% of Assistant Teachers retained) than for preschool teachers (83% of Lead Teachers and 74% of Assistant Teachers retained). CDEC has prioritized infant/toddler teachers in stimulus and Universal Preschool Program efforts, which could have been a contributor to comparable retention rates for lead infant/toddler teachers. The retention rate among FCCH workers, at 86%, was higher than among center-based workers (Figure 4).

> **Key Metric: 12-Month Retention**
> **Directors: 93%**
> **Lead Teachers: 83%**
> **Assistant Teacher: 74%**

Figure 2. 12-Month Center-Based Retention: By Demographics (n=23,735)

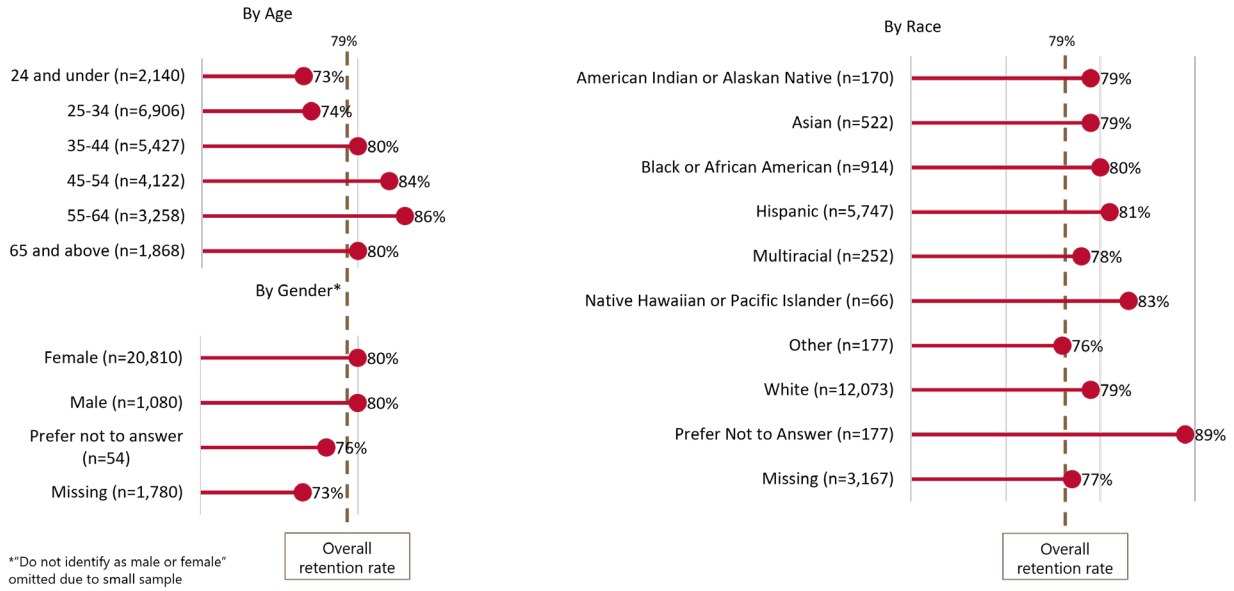


Figure 3. 12-Month Center-Based Retention: By Role (n=19,551)

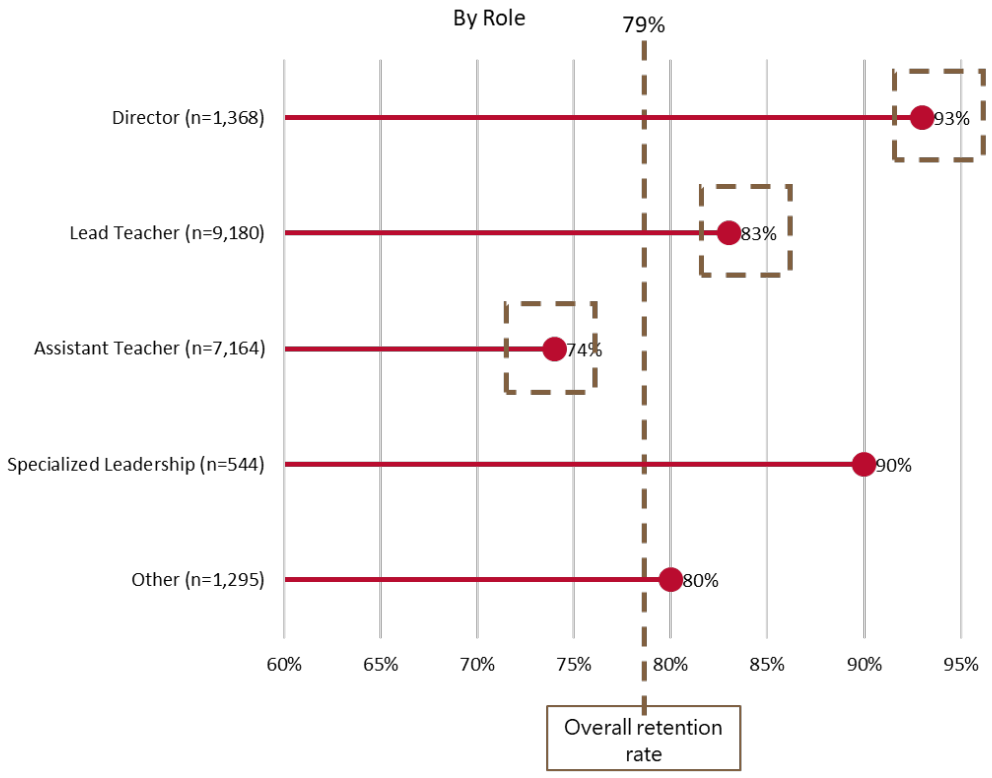
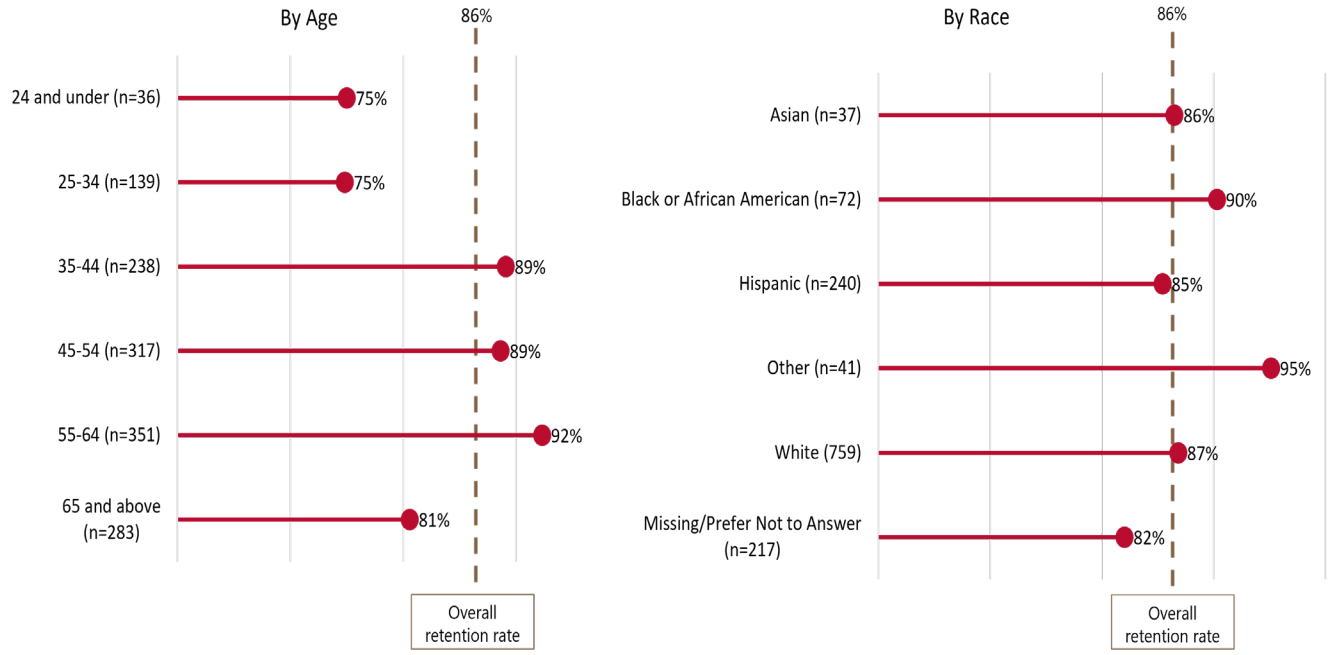


Figure 4. 12-Month FCCH Retention: By Demographics



Advancement

> **Looking across two years of data, 722 Assistant Teachers in the 2021–2022 workforce were promoted to Lead Teacher roles in 2022–2023; 112 Lead Teachers were promoted to Director roles, and 23 Assistant Teachers were promoted to Director.**

Figures 5, 6, and 7 show the flow between roles of individuals in the 2021–2022 center-based active cohort who were retained in 2022–2023, including for all roles (Figure 5), Lead Teachers only (Figure 6), and Assistant Teachers only (Figure 7). We see expected promotion paths in the overall cohort diagram, especially from Assistant Teacher to Lead Teacher and from Lead Teacher to Director. We do not see particular movement between age groups for either Assistant Teachers or Lead Teachers.

Figure 5. Progression Over Two Years for Individuals Employed During School Year 2021–2022

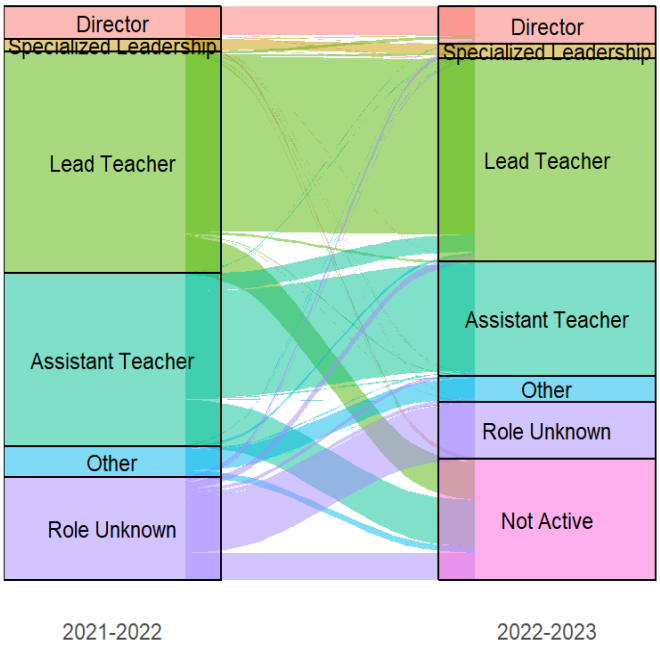


Figure 6. Progression Over Two Years for Assistant Teachers, by Ages Served Employed During School Year 2021–2022

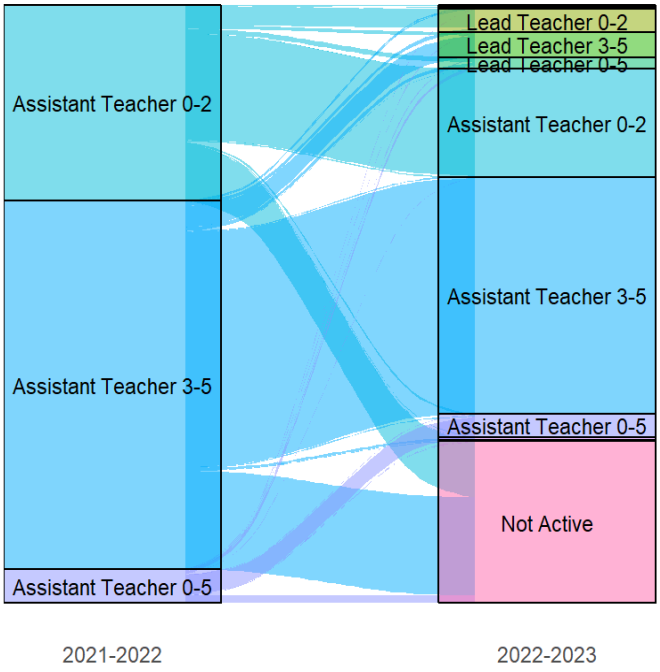
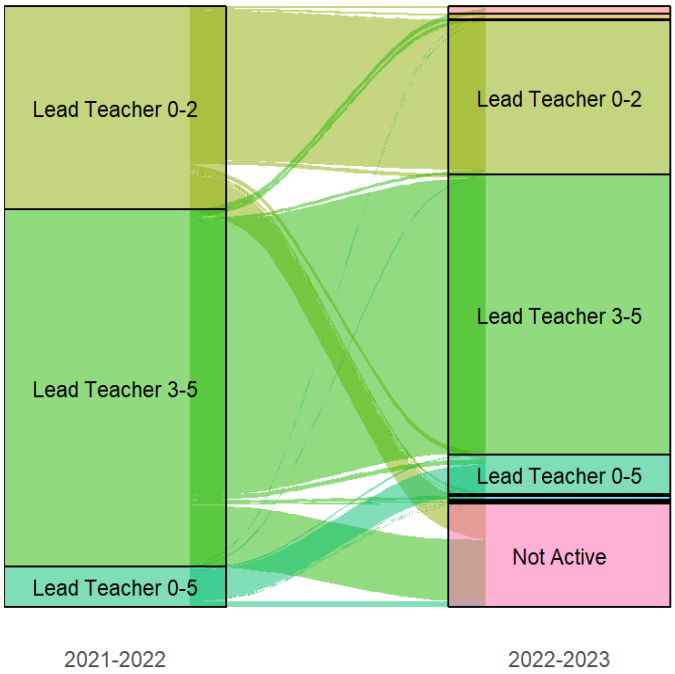


Figure 7. Progression Over Two Years for Lead Teachers, by Ages Served Employed During School Year 2021–2022



Note that the unlabeled segments in Figure 7 include the following roles: Director, Specialized Leadership, Other, and Role Unknown.

New Entrants

> **New child care workers generally skewed younger than the current workforce.**

New entrants were proportionately younger than the overall 2021–2022 center-based cohort, with 30% age 24 years and under as compared to 9%. As shown in Table 3, the new entrants otherwise tend to differ from the current workforce primarily in that there are significantly fewer with missing demographic data. This is likely a residual effect from the PDIS system update and shows that data quality and completeness are improving.

Table 3. 2021–2022 Cohort vs 2022–2023 New Entrants by Demographics

	2021–2022 Cohort		2022–2023 New Entrants	
	N	%	N	%
Total	23,735	-	6,145	-
Race/Ethnicity				
White	12,073	50.9%	3,202	52.1%
Hispanic	5,747	24.2%	1,898	30.9%
Black or African American	914	3.9%	329	5.4%
Asian	522	2.2%	181	2.9%
Other[iii]	862	3.6%	291	4.7%
Missing	3,617	15.2%	244	4.0%
Age Group				
24 and under	2,140	9.0%	1,832	29.8%
25-34	6,906	29.1%	2,062	33.6%
35-44	5,427	22.9%	1,077	17.5%
45-54	4,122	17.4%	614	10.0%
55-64	3,258	13.7%	405	6.6%
65 and above	1,868	7.9%	149	2.4%
Gender				
Female	20,810	87.7%	5,618	91.4%
Male	1,080	4.6%	273	4.4%
Other[iv]	1,834	7.7%	254	4.1%

Growth

> **Patterns in workforce growth by characteristic reflect improvements in data quality.**

The overall center-based workforce grew from 23,735 in 2021–2022 to 24,962 in 2022–2023, a 12-month growth rate of 5%. The FCCH workforce decreased by 1% over the same period. The FCCH workforce was not required to report information in the PDIS system until spring 2024 which likely influences the accuracy of their representation in the system and, therefore, the growth rate. Figures 8 and 9 explore this growth rate by role in more detail; overall, changes in how data are entered appear to be masking true distinctions in growth rates by role.

> **Key Metric: 12-Month Growth Rate**
> **5%**

[iii] "Multiracial," "Other," "Prefer Not to Answer," "American Indian or Alaskan Native," and "Native Hawaiian or Pacific Islander" are combined as "Other" due to small samples.
[iv] "Missing," "Prefer not to answer", and "Do not identify as male or female" are combined due to small samples.

Figure 8. 12-Month Growth Rate by Role

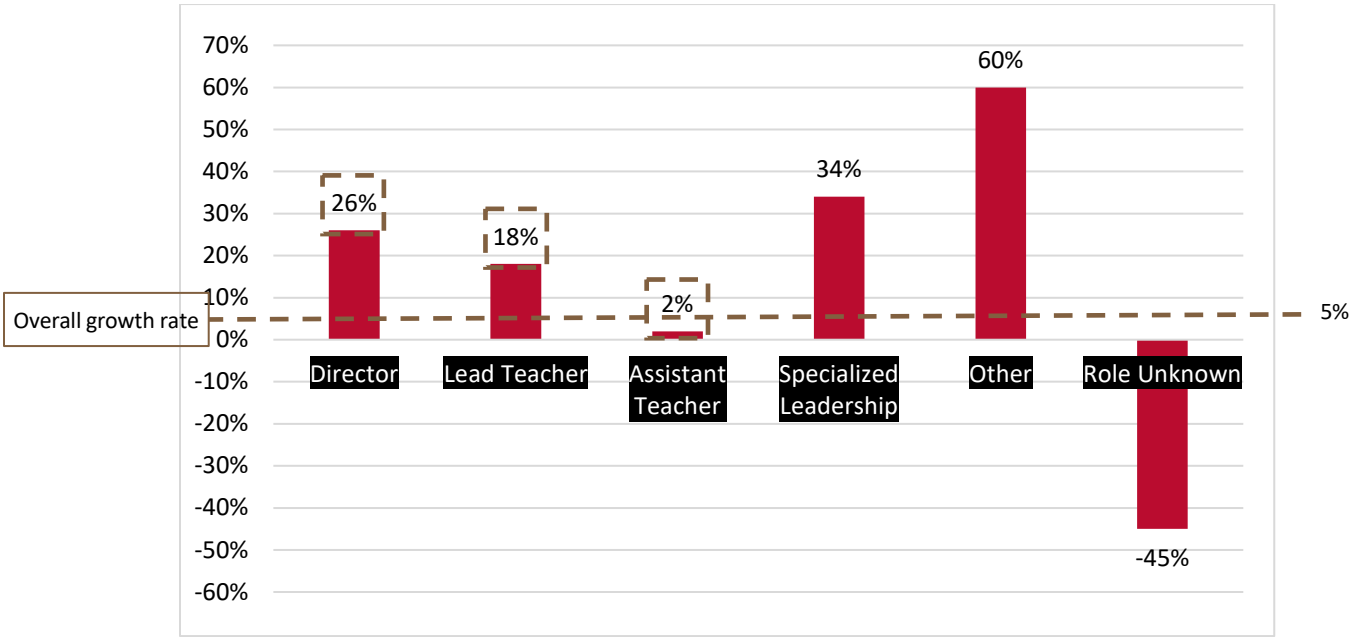
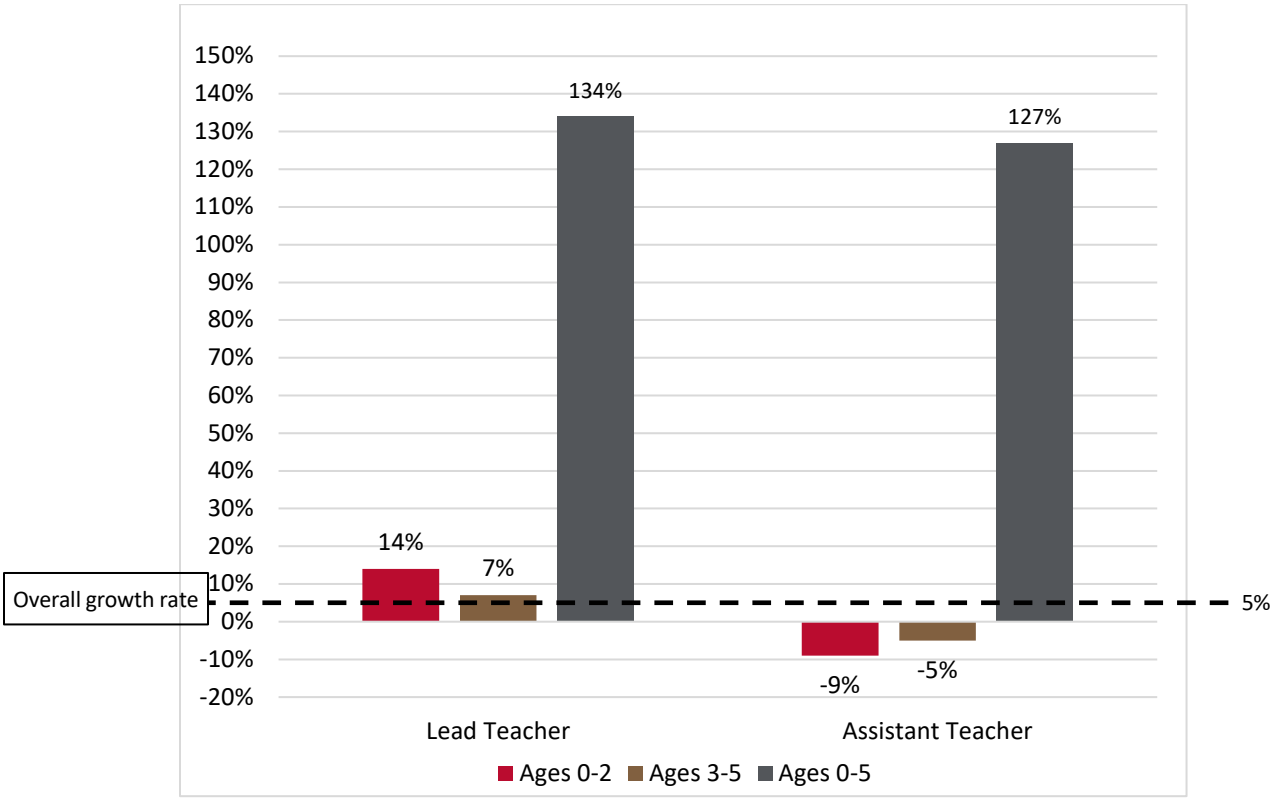


Figure 9. 12-Month Growth Rate by Teacher Roles and Ages Served



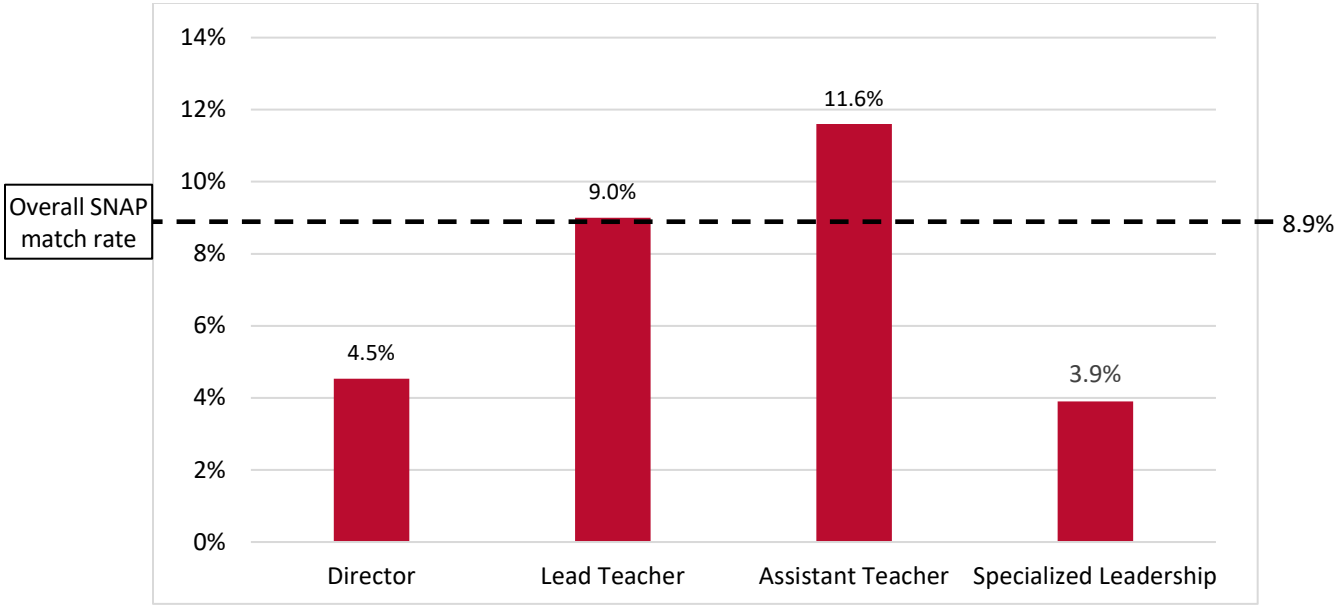
SNAP and CCCAP

> **Links between the child care workforce and public assistance datasets show low (<10%) participation in these programs while working in child care.**

The LINC team connected PDIS worker records with state records for Supplemental Nutrition Assistance Program (SNAP) and the Colorado Child Care Assistance Program (CCCAP). Overall, 8.9% of active ECE professionals in the 2021–2022 school year were receiving SNAP benefits in the same year. As shown in Figure 10, this rate was slightly higher among Assistant Teachers (11.6%) and lower among Directors (4.5%). This figure was lower among the FCCH workforce (5.3%).

> **SNAP Match Rate**
> **8.9%**

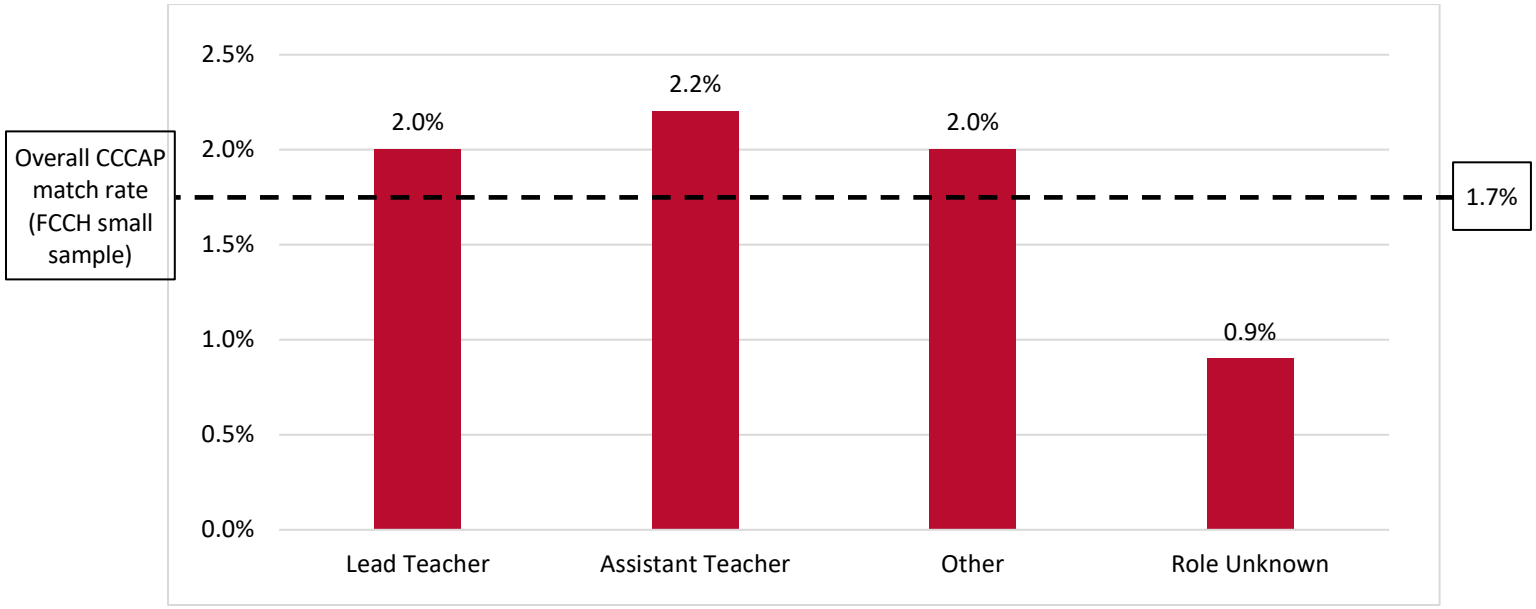
Figure 10. SNAP Match Rate by Role



The rate of CCCAP receipt by the 2021–2022 center-based cohort was 1.7%. This varied minimally by role.

> **CCCAP Match Rate**
> **1.7%**

Figure 12. CCCAP Match Rate By Role



Discussion

By implementing a methodology to refine hire and end dates, we were successful in calculating key retention and growth metrics and explored the relationship between these metrics and worker characteristics. Retention analyses confirmed that workers in more advanced positions, those who are older, and those employed in FCCH are more likely to be retained than the overall workforce. These patterns match what would be expected; these characteristics are also correlated with one another (i.e., workers in more senior positions and those at FCCH providers are more likely to be older). Likewise, as expected, new entrants skew younger than the center-based workforce.

This brief also described two new areas of analysis that add additional detail on the ECE workforce. A flow analysis of roles successfully identified groups of teachers progressing from Assistant Teacher to Lead Teacher and from Lead Teacher to Director. These promotion pathways could be used to develop outcomes for analyses of worker advancement. Additionally, matches between the ECE workforce and the SNAP and CCCAP programs found seemingly low rates of take-up among ECE workers. For example, roughly 9% of active ECE professionals in the 2021–2022 school year were receiving SNAP benefits and less than 2% in CCCAP. Although this SNAP rate is similar to the overall Colorado SNAP participation rate of 9.3%[1], prior analyses suggest this is a low wage population where we would expect higher levels of participation. The CCCAP rate is harder to benchmark but seems potentially low given the workforce is nearly 90% female with over 60% aged 44 or younger.

Recommendations

The method for refining hire and end dates described in this brief appears to balance complexity and accuracy well. We recommend it for the development of future retention and growth metrics.

We recommend that CDEC identify additional metrics to track advancement among key positions, such as the percent of Assistant Teachers promoted to Lead Teacher.

We note in this brief that new entrants tend to be younger than the existing workforce, and newer, younger workers are a priority for retention for the workforce in the long term. As more years of PDIS data become available, it will become especially important to track new hire outcomes, such as retention of new hires only, to identify successes and opportunities unique to this group.

While the low match rates between the ECE workforce and public assistance are below what we might expect based on the average pay in this industry, they are in line with overall take-ups rates in Colorado. Future analyses that incorporate wage data could further contextualize this problem, for example by identifying workers who would likely be ineligible for these programs based on their income and exploring how participation in public benefit programs may improve retention and provide stability for workers in lower wage roles, such as Assistant Teacher. To the extent that child care workers are a population with high rates of eligibility for these benefits, targeting child care centers to promote take up of assistance programs could improve participation rates for this population.

Lastly, the CDEC has launched a new annual income & benefits survey within the PDIS that is optional and open to all users starting in 2024, including questions about public assistance. This is a promising data collection strategy that could provide more detailed information about wages, benefits, and public assistance to supplement what is learned from the wages through the LINC project.

Endnotes

[1] U.S. Department of Agriculture Economic Research Service (2024, February 23). *Key statistics and research.* https://www.ers.usda.gov/topics/food-nutrition-assistance/supplemental-nutrition-assistance-program-snap/key-statistics-and-research/