Bearing the Cost of Early Care and Education in Colorado: An Economic Analysis

September 2017

Prepared for
Early Milestones Colorado

EARLY MILESTONES COLORADO

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Acknowledgments

This report was developed as part of the *Transforming the Early Childhood Workforce in Colorado* project, an innovative public-private partnership to advance the early childhood workforce in Colorado.

Steering partners for the project include Early Milestones Colorado, Colorado Department of Education, and Colorado Department of Human Services. Philanthropic partners include the Piton Foundation at Gary Community Investments and the Buell Foundation.

Special thanks to Christi Chadwick, Brian Conly, Heather Craiglow, Lauren Heintz, Nancie Linville, Kristina Mueller, Jennifer O'Brien, Diana Schaack, and Jennifer Stedron.

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Recommended citation:

Franko, M., Brodsky, A., Wacker, A., & Estrada, M. (2017). *Bearing the cost of early care and education in Colorado: An economic analysis.* Denver: Butler Institute for Families, Graduate School of Social Work, University of Denver.

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Introduction

Early care and education is a complex industry that is driven both by elements of a public good and the private market. Its public missions are to provide high-quality care and education to children and to enable parents to work and contribute to the larger economy. Some providers operate entirely on parental fees, while others use a combination of philanthropic and public funding sources to balance budgets. The industry includes private, public, and nonprofit entities, as well as non-licensed care providers outside the formal market structure, and each of these are working to varying degrees toward goals of profit, safety, education, and quality.[1]

Given this complex environment, key early care and education leaders and policy makers in Colorado, including Early Milestones Colorado, the Colorado Department of Education (Office of Early Learning and School Readiness), and the Colorado Department of Human Services (Office of Early Childhood), created the Transforming the Early Childhood Workforce project as a public-private partnership to develop and test sustainable approaches to strengthening the early childhood workforce in the state. As part of this effort, they wanted to better understand how the early care and education sector functions within Colorado's economy, while also exploring the factors that influence how the industry operates and the effect of those operations on the industry's labor force.

Early Milestones Colorado enlisted the Butler Institute for Families at the University of Denver and Brodsky Research & Consulting to explore these issues in the context of the current study. The primary purposes of the study are to:

1. Describe the role of the early care and education sector in Colorado's economy
2. Explore the cost of early care and education in Colorado
3. Explain the implications of low wages and turnover in Colorado's early care and education industry
4. Identify the extent to which Colorado's early care and education sector operates as a market-based industry

This report is organized around these core topic areas. Each section provides answers to key questions that help shed light on how and why the early care and education sector operates as it does, with a focus on data that are specific to Colorado.

[1] Zaman, A., Amin, R., Momjian, I., and Lei, T. (2009). Complexities in managing the child care industry: An observation on challenges and potentials. *Education, 132*(4), 739–753.

Executive Summary

Colorado's economy is healthy, with higher average annual income and personal income growth, and lower unemployment rates than in the United States as a whole. Within the context of this thriving economy, the licensed, paid early care and education industry serves over 100,000 children birth-4 years old[2] and employs more than 22,000 workers.[3] It adds $2.25 to the state economy for every dollar of services purchased in the industry, and it enables parents to participate in the state's workforce, generating $4.4 billion in earnings annually.[4] At the same time, the cost of high-quality care is prohibitive for many families in Colorado[5], programs have to make difficult choices when revenues do not meet expenses, and wages for the early care and education workforce do not promote family self-sufficiency.[6]

This report explores this paradox. With an industry so vital to the state economy and workforce, why are early childhood programs forced to make difficult choices around supporting the families, children, and workforce that relies on them?

The Early Care and Education Sector Is a Key Driver for Colorado's Economy

The early care and education sector is a key driver for the state's economy. The industry itself directly produces over $639 million and 22,000 jobs annually.[7] It also indirectly generates nearly $800 million in annual sales and services, over 10,000 jobs, and more than $265 million in related earnings across Colorado's economy. Considered all together, the industry generates $1.4 billion in annual sales and services, over 32,000 jobs, and more than $619 million in related statewide earnings.[8] Its total economic impact is similar to other educational sectors (e.g., K–12 and higher education) and industries such as home health care, hotels and lodging, amusement and recreation services, and food and drinking services.[9]

The early care and education sector also generates additional economic benefits that other industries don't. It generates $4.4 billion in earnings annually by enabling parents to work and

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[2] Calculated using data from: Child Care Aware of America. (2015). *State child care facts in the state of Colorado.*
[3] RegionTrack, Inc. (2015). *Child Care in State Economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[4] Bureau of Economic Analysis. (2015). Table 1.5: Total Multipliers for Output, Earnings, Employment, and Value Added by Detailed Industry Colorado (Type II) & Table 2.5: Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation Colorado (Type II).
[5] RegionTrack, Inc. (2015). *Child Care in State Economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[6] Bureau of Economic Analysis. (2014). *Real Personal Income for States and Metropolitan Areas, 2014*. News Release, July 7, 2016. U.S. Department of Commerce: Washington, DC.
[7] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[8] Authors' calculations and analyses. See full report for details.
[9] Bureau of Economic Analysis. (2015). Table 1.5: Total multipliers for output, earnings, employment, and value added by detailed industry Colorado (type II) & Table 2.5: Total multipliers for output, earnings, employment, and value added by industry aggregation Colorado (type II).

it saves the economy $832 million each year due to the long-term effects of a quality early education (e.g., avoided special education and juvenile justice costs and increased lifetime earnings).[10]

Families and Early Care and Education Professionals Bear the Cost

Currently, public programs provide approximately 28% of the revenue for Colorado's early care and education industry, while private sources, primarily family fees, pay the remaining 72%.[11] In addition to the costs paid by families, the costs borne by early care and education businesses and professionals are also substantial:

- Families in Colorado with an infant or toddler in center-based care pay 44% more for a year of care than they would pay for a year of public college tuition in the state[12]
- A typical early care and education business operating at a level 3 on the Colorado Shines quality rating system has to cover an average annual gap between revenues and expenses of over $37,000[13]
- Early care and education professionals earn just 51% of the average salary for kindergarten teachers in Colorado, placing them at the poverty level for a family of four

Because of the high cost of paid, licensed early care and education, many families find alternatives, such as family, friends, and neighbors (FFN) who will either provide care for free or for substantially lower costs than the licensed system. Recent national studies estimate that FFN providers care for nearly 60% of children in families where all available parents work.[14] Other parents drop out of the workforce altogether.

Early care and education businesses and professionals also have to make choices to enable them to bear the cost of providing child care in an environment where revenues do not meet expenses. For businesses, this can mean cutting costs (and related quality), most frequently by paying extremely low wages and hiring less qualified workers to fill open positions. For early care and education professionals, the price is wages so low that they qualify for public subsidy programs like the Supplemental Nutrition Assistance Program (SNAP), Housing and Urban Development (HUD) assistance, and Medicaid/Child Health Insurance Plans.[15]

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[10] Authors' calculations and analyses. See full report for details.
[11] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[12] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[13] Authors' modeling. See report for full details.
[14] Davis, N. (2013). *School readiness for all: The contribution of family, friend, and neighbor care in Colorado.* Denver, CO: Colorado Children's Campaign.
[15] *Pearce, D. (2015). The self-sufficiency standard for Colorado 2015.* Denver, CO: The Colorado Center on Law and Policy.

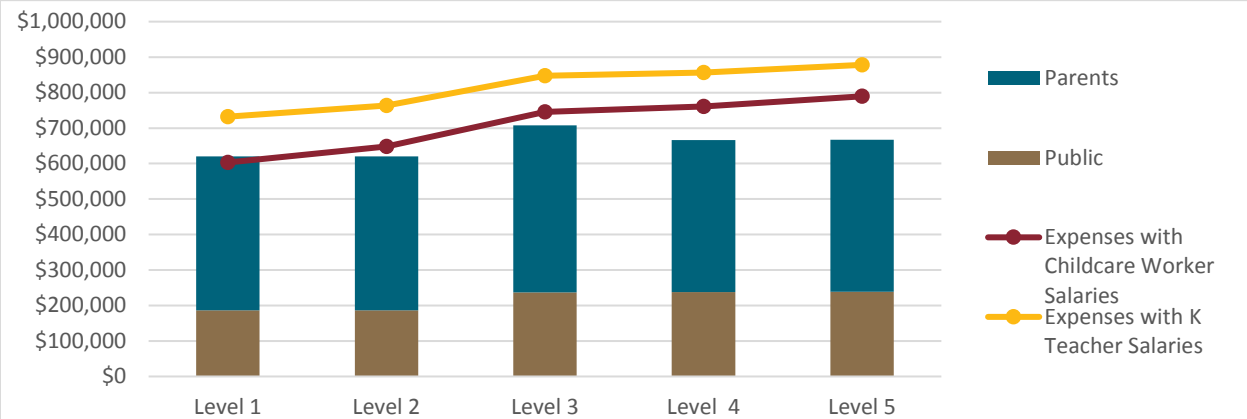
The children themselves also pay a price for a system that is not adequately funded. When families can't afford quality care and when early care and education businesses can't afford to provide quality care, children may spend their earliest, formative years in environments that do not adequately prepare them for school and life. The $832 million in economic benefits from quality care that Colorado currently realizes comes from children who are in programs that are accredited or that are Level 3 or higher on the Colorado Shines rating system. This number could be substantially higher if more children were in high-quality care from birth through age four. Unfortunately, the industry cannot afford to provide this kind of quality to all children.

Understanding What Drives the Industry's Lopsided Balance Sheets

To better understand the drivers that influence the costs of providing early care and education, we adapted an economic model developed by Louise Stoney and Libby Poppick in 2016. Adaptations included salary adjustments to reflect current data, variations to wages based at increasing provider quality levels, county-specific modifications to market and reimbursement rates, and staff-child ratio updates.

Collectively, our modeling shows that early care and education revenue sources in Colorado are insufficient to meet the costs of providing high-quality early care and education, even at the low wages that are prevailing for childcare workers and preschool teachers. At livable salaries comparable to their kindergarten teacher peers, the gap between revenues and expenses widens even further. Figure 1 shows a mid-sized early care and education provider in a medium cost-of-living county that serves 30% subsidy clients, provides infant/toddler care, and has industry standard levels of bad debt (3%) and staff turnover (30%).

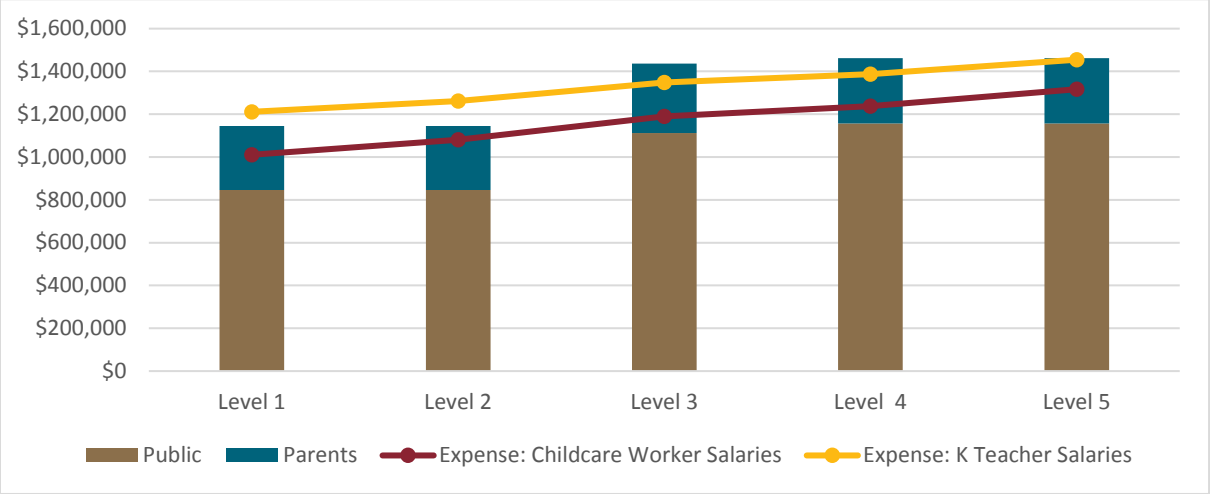
Figure 1. Expenses/revenues under typical operating scenario



Several factors impact the revenue and expense balance, but the most significant factors are teacher salary levels, regional market rates and child care reimbursement structures, provider size, whether a provider serves infants and toddlers, turnover rates, and levels of bad debt (unpaid tuition).

To the extent that providers can adjust for these factors, they could improve their sustainability and profitability. For instance, a *large* provider in the same mid-range cost-of-living region of the state as the typical scenario above would be able to meet or exceed expenses if they were to serve 75% of children through public reimbursement, *not* serve infants and toddlers, and have exceptionally low turnover (10%). These same providers could even raise salaries to parity with kindergarten teachers and still meet expenses at high levels of quality, assuming tiered reimbursements that meet or are higher than market rates at high-quality levels, as they are in this Colorado county (Figure 2).

Figure 2. Expenses/revenues under profit-maximizing operating scenario



However, building a large early care and education business with such low turnover requires significant capital and operating investments along with strong workforce incentives to minimize turnover. Additionally, in some rural communities, there is simply not a market to support this kind of large center. Furthermore, excluding services for infants and toddlers is a burden on children and families that is already reflected in the market, which statewide only has licensed capacity to care for 18% of children under 2 years old.[16] Similarly, there are not enough child care support dollars available to allow all businesses to serve a high proportion of children with subsidized care, and in some counties, the reimbursement structure does not support strong tiered reimbursement structures that incentivize quality.

Solutions for Market Failure in the Early Care and Education Sector

The reality of the early care and education economy and the ideal are presently far apart. As the early care and education industry currently operates, families are unable to pay the full cost of

[16] Qualistar Colorado and Colorado Children's Campaign. (2014). *Child care affordability in Colorado: An investigation into child care costs and recommended strategies for improving affordability*. Denver, CO: The Women's Foundation of Colorado.

the quality care and education that they want and that society benefits from. However, society is not picking up the marginal costs between what families can afford and what quality services cost. The result is that the early care and education sector is in market failure.

Innovative strategies are needed to create sustainability within the sector. Possible solutions may include: increasing public funding for early care and education in Colorado to the national average, creating institutional subsidies, instituting tax credits for early learning professionals, and shifting turnover expenses to increased salaries. In particular, based on the results of the current study, the report makes the following recommendations:

Increase funding for early care and education subsidies. Current public funding for early care and education subsidies, such as the Colorado Child Care Assistance Program (CCCAP), the Colorado Preschool Program (CPP), and Head Start does not meet the demand for these services.[17,18] Additional funding for early care and education funding assistance could help more children and families access quality care, put more parents in the workforce, improve the solvency of providers, and increase resources for raising early childhood teachers' salaries. State lawmakers should explore opportunities for either accessing more federal funding and/or creating new state early care and education funding streams.

Improve tiered reimbursement structures. Our modeling demonstrates that counties with tiered reimbursement strategies that effectively incentivize quality and the care of infants and toddlers can promote provider sustainability. In addition, those counties that reimburse quality programs at or above market rates are better able to counteract the market failure of the industry. In Colorado, the state and counties should work together to encourage each county to set reimbursements rates that will encourage the provision of infant/toddler care and maximize high-quality early care and education for all children.

Create institutional subsidies. Institutional subsidies have been used to support other industries we value as a society, such as solar energy and farming, where the public sector steps in to pay the marginal cost of a public good. A similar mechanism for the early care and education industry could be made available to providers as direct institutional subsidies that are tiered to reflect quality levels and the care of infants and toddlers. That is, higher quality providers, and especially those who provide care to underserved age groups, should be incentivized with higher subsidies. To support workforce wages, businesses receiving subsidies should be required to use those funds to increase wages of early care and education professionals.

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[17] Hardin, J. & Fulton, B. (2017). Colorado Child Care Assistance Program stakeholder convening series final report. Denver, CO: Civic Canopy.
[18] Colorado Department of Education. (2016). *Colorado Preschool Program Amended Legislative Report*. Denver, CO.

Institute tax credits for early care and education professionals. At a time when the state has greatly increased professional development and educational expectations for early care and education professionals, it is more important than ever to recognize increased skill development with appropriate wage increases. One option for improving workforce retention, reducing turnover, and compensating professionals for their increased educational attainment is to institute professional tax credits that award refundable, graduated tax credits to early childhood educators who earn increasingly higher levels of education and credentials.[19]

These recommendations and the research supporting them are explored more deeply in the full report.

Methodology

To address the questions of this study, the research team primarily used secondary data analysis, literature review, and economic modeling. A wide range of data exists about specific elements of the early care and education sector and the Colorado economy, but much of the data was not collected for the purposes of positioning the early care and education industry within Colorado's economy, identifying market and government forces driving industry operations, or explaining causes of and potential solutions to low wages and high turnover in the sector. The Butler/Brodsky team identified and used appropriate data to answer funders' questions and identify potential solutions.

Definitions

Within the early childhood industry, there are many different ways to talk about the different types of services related to the care and education of young children. This section defines common terms and how we have used them in this report.

Early care and education: Early care and education refers to licensed or otherwise legally recognized service providers who deliver paid care and education services to children from birth to kindergarten entry. This definition includes child care centers, preschool programs, school-based prekindergarten, and licensed family child care.

We recognize that a large proportion of the sector falls outside of this definition, including unlicensed and/or unpaid family, friend, and neighbor providers and providers of care for children ages 5–14 years old. Where data we present does not fit into this definition, we note variations and talk about how to interpret the data in context.

Early care and education establishment or provider: An early care and education establishment or provider is an individual proprietor or an entity that delivers paid early care and education services. Examples include non-profit organizations, for-profit settings, school

[19] Ullrich, R., Hamm, K., & Schochet, L. (2016). *Six policies to support the early childhood workforce*. Washington, DC: Center for American Progress.

districts, and family child care homes. We use the terms establishment and provider interchangeably in this report.

Early care and education professional: Throughout this report, we use federal designations for occupations that are responsible for the care and education of children birth to kindergarten entry. The two main federal occupation titles that fall under this definition are Childcare Worker and Preschool Teacher, Except Special Education.

Childcare worker: The US Department of Labor, Employment and Training Administration uses the title of Childcare Worker to refer to early care and education professionals who:

- Attend to children at schools, businesses, private households, and childcare institutions.
- Perform a variety of tasks, such as dressing, feeding, bathing, and overseeing play.[20]

Preschool teacher: The US Department of Labor, Employment and Training Administration uses the title of Preschool Teacher, Except Special Education to refer to early care and education professionals who:

- Instruct preschool-aged children in activities designed to promote social, physical, and intellectual growth needed for primary school in preschool, day care center, or other child development facility.[21]

[20] Colorado Department of Labor and Employment. (2017). labor market information gateway occupational summary of job duties. Retrieved on 3/4/17.
[21] Colorado Department of Labor and Employment. (2017). Labor market information gateway occupational summary of job duties. Retrieved on 3/4/17.

CHAPTER 1: The Impact of the Early Care and Education Sector on Colorado's Economy

Overview of Colorado's Economy and the Early Childhood Sector

Colorado's early childhood sector operates within a state and national economic context that is important to understand as a backdrop for the rest of this report. Coloradans' incomes are growing faster and are a bit higher than the national average, although the cost of living is also higher than national trends. This higher cost of living is reflected in families' early care and education expenses. The following section provides general information about Colorado's economy and early care and education sector in 2014, the most recent year that US Bureau of Economic Analysis and Census Bureau data are available.

Colorado economy. Colorado has a healthy economy relative to national trends. In 2014, the cost of living in the state was about 2% higher than the national average.[22] Incomes were also on the rise; between 2013 and 2014, Colorado experienced the second greatest increase in personal income in the country, at about 4.5%. Similarly, average personal income in Colorado in 2014 was more than $2,000 higher annually than the national average.[23] Unemployment was 1.2 points lower in the state than nationally.[24] Table 1 provides an overview of Colorado's economic data relative to the same data for the United States as a whole.[25]

Table 1. Colorado's economy, 2014-2015

	Colorado	United States
Cost of Living *(RPP)*	102	100
Personal Income Growth, 2013–14	4.5%	3.6%
Average annual income[26]	$51,177	$48,320
Unemployment rate	5.0%	6.2%

[22] Based on the "regional price parity. According to Bureau of Economic Analysis at the US Department of Commerce, Regional Price Parities (RPP) "measure of the differences in the price levels of goods and services across states and metropolitan areas for a given year." The US average is always 100, so regions with an RPP above 100 have a higher cost of living than the national average, while regions with a RPP lower than 100 have a lower cost of living than the national average.

[23] Bureau of Economic Analysis. (2014). *Real personal income for states and metropolitan areas, 2014*. News Release, July 7, 2016. Washington, DC: US Department of Commerce.

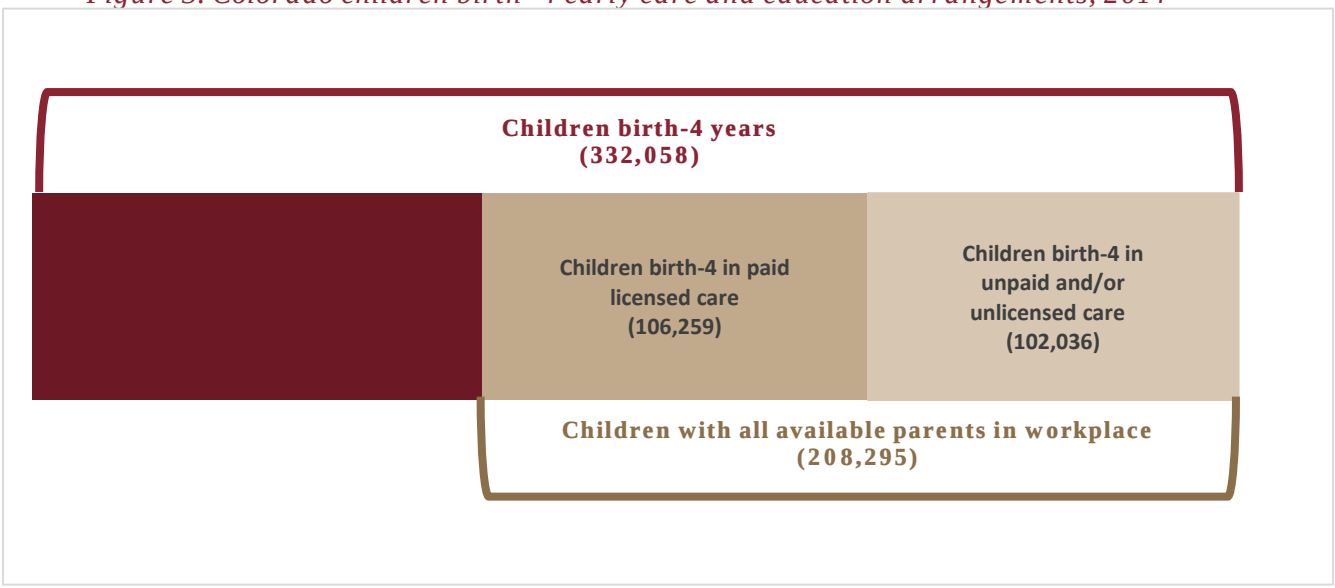
[24] Business Research Division, Leeds School of Business, University of Colorado Boulder. (2016). *Colorado business economic outlook 2016*.

[25] Bureau of Economic Analysis. (2014). *Real personal income for states and metropolitan areas, 2014*. News Release, July 7, 2016. Washington, DC: US Department of Commerce. Retrieved from https://www.bea.gov/newsreleases/regional/rpp/rpp_newsrelease.htm.

[26] Bureau of Labor Statistics: Occupational Employment Statistics, May 2015. https://www.bls.gov/oes/#news (US number); Colorado Department of Labor and Employment. (2017). Labor market information gateway. https://www.colmigateway.com (Colorado number). https://www.bls.gov/oes/#news (US number); Colorado Department of Labor and Employment. (2017). Labor Market Information Gateway. (Colorado number).

Early care and education industry in Colorado. According to data from the US Census Bureau's Current Population survey, nearly 63% of children birth through 4 years old have all available parents in the workforce. Of these, over half (51%) were in *paid, licensed* early care and education in 2014 (Figure 3).[27] Children not in paid, licensed care are typically in family, friend, and neighbor (FFN) care that is either not paid or not licensed. Recent national studies estimate that FFN providers care for nearly 60% of children in families where all available parents work.[28] The focus of the current study is on the paid, licensed early care and education industry, but the FFN sector clearly plays a large role in parental choices for early care and education that no doubt impacts the paid, licensed industry.

Figure 3. Colorado children birth–4 early care and education arrangements, 2014



In 2014, the early care and education industry in Colorado was comprised of over 10,000 child care establishments[29], including more than 4,000 paid and licensed early care and education providers[30]. Just over 89% of early care and education care establishments in the state are sole proprietors (e.g., home-based early care and education and paid relative care), and nearly 11% are businesses with paid employees (center-based early care and education providers).[31] Although home-based early care and education and paid relative care make up the majority of

[27] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[28] Davis, N. (2013) *School readiness for all: The contribution of family, friend, and neighbor care in Colorado.* Denver, CO: Colorado Children's Campaign.
[29] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[30] Colorado Department of Human Services licensing database. (2016). Figure excludes school-age care providers.
[31] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.

Colorado average annual income, 2015

$25,065 Childcare workers

Preschool Teachers **$29,998**

$51,177 All Coloradans

Source: Colorado Labor Market Information Gateway

early care and education establishments in Colorado, over 90% of children in paid care in the state are in center-based care.[32]

The paid early care and education industry in Colorado employed over 22,500 people in 2014, which was approximately 1% of the state's total employed labor force that year.[33] The average annual salary for Colorado's childcare workers in 2015 was $25,065, which was 49% of the average annual income for all Coloradans of $51,177 and was just above the $24,250 poverty threshold for a family of four in 2015.[34,35] Similarly it was below the self-sufficiency standard for one adult and one preschooler for even the lowest-cost counties in Colorado (the self-sufficiency standard ranged from $27,501–$63,717 across Colorado's counties in 2015).[36] Preschool teachers had a mean salary of $29,998 in 2015, which is higher than that of childcare workers, but is still only 59% of the average annual income for all Coloradans.[37]

Table 2. Colorado's early care and education sector, 2014–2015[38,39]

	Colorado
Children birth–4 years old[40]	
Total number of Colorado children birth–4	332,058
Children birth–4 with all available parents in the workforce	208,295
Children birth–4 in paid licensed care	106,259
Children birth–4 in unpaid and/or unlicensed care	102,036
Early care and education establishments	
Total number of licensed early care and education establishments[41]	4,313

[32] Qualistar Colorado and Colorado Children's Campaign. (2014). *Child care affordability in Colorado: An investigation into child care costs and recommended strategies for improving affordability*. Denver, CO: The Women's Foundation of Colorado.
[33] Calculated using 2014 child care employment data from *Child care in state economies* and 2014 Colorado total employment data from *Colorado business economic outlook 2016*.
[34] Colorado Department of Labor and Employment. (2017). Labor Market Information Gateway. https://www.colmigateway.com.
[35] Federal Poverty Guidelines, 2015. Retrieved from: https://aspe.hhs.gov/2015-poverty-guidelines.
[36] Pearce, D. (2015). *The self-sufficiency standard for Colorado 2015*. Denver, CO: The Colorado Center on Law and Policy.
[37] Colorado Department of Labor and Employment. (2017). Labor Market Information Gateway. https://www.colmigateway.com.
[38] Calculated using data from: Child Care Aware of America. (2015). *State child care facts in the state of Colorado.*
[39] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[40] Calculated using data from: Child Care Aware of America. (2015). *State child care facts in the state of Colorado.*
[41] Colorado Department of Human Services licensing database (2016). Figure excludes school-age care providers.

	Colorado
Percent sole proprietors	89.3%
Percent businesses with paid employees	10.7%
Employment	
Total number of people employed	22,501
Early care and education revenue	
Annual industry revenue (in millions, 2012)	$639.7
Public funding as a share of industry revenue	28.3%

The industry as a whole took in nearly $640 million in revenue in 2012. As we mentioned earlier, the industry derives its revenue from a combination of parental fees, foundation dollars, and public funds. In Colorado, public funding represented just over 28% of industry revenue, which is substantially lower than the nearly 38% share of funding from public sources nationwide.[42]

Family expenses for early care and education in Colorado. The cost of living in Colorado is higher than the national average, and early care and education is no exception. The cost of center-based infant care is more than 40% higher in Colorado than nationally, while the cost of home-based infant care is nearly 30% higher than the national average. The cost of care for a 4-year-old in either home- or center-based care is 26% higher in Colorado than it is nationally. [43] Indeed, Colorado is one of the top ten least affordable states for infant and four-year-old care.[44] For Colorado families, it is nearly as expensive or more expensive to pay for a year of early care and education as it is to pay for a year of public college tuition (Table 3).

144%

... The average annual cost of center-based care for an infant in Colorado, compared to the cost of attending a 4-year public college for a year.

RegionTrack, Inc. (2015). *Child Care in State Economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.

[42] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[43] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[44] NACCRRA/Child Care Aware of America: Parents and the High Cost of Child Care: 2014 Report. December 2014.

Table 3. Cost of early care and education, 2014[45]

	Colorado	United States
Average Annual Costs of Early Care and Education		
Infant Care – Center	$13,143	$9,185
% of Income	26.9%	19.9%
% of Public College Cost	144.5%	103.3%
Infant Care – Home	$8,817	$6,828
% of Income	18.0%	14.8%
% of Public College Cost	96.9%	76.8%
4-Year Old Care – Center	$9,871	$7,805
% of Income	20.2%	16.9%
% of Public College Cost	108.5%	87.8%
4-Year Old Care – Home	$8,183	$6,500
% of Income	16.7%	14.1%
% of Public College Cost	90.0%	73.1%

The Child Care Paradox

Although child care is prohibitively expensive for families, parent fees alone generate insufficient revenue for childcare businesses to operate high-quality programs that give childcare workers a living wage.

[45] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.

Colorado's Early Childhood Sector: An Economic Lens

While we have a broad picture of the economic reality of early care and education in Colorado, what has been less clear is ***what role the early care and education sector plays in the state's economy overall***. To understand this, the research team examined several key questions:

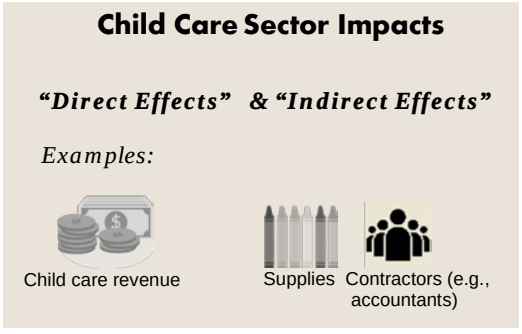
- How much does the early care and education industry contribute to the state's economy?
- How much do parents add to the economy when they have the early care and education they need to go to work?
- How do better cared-for and educated children add to the economy over time?
- What size is Colorado's early childhood sector relative to the state's economy as a whole?
- How much does the early care and education industry need to grow to keep up with expected economic and population growth over the next ten years?

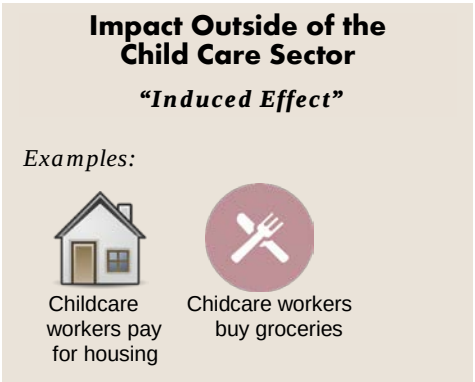
This section provides answers to these questions.

Economic Benefit of the Early Care and Education Sector

When an early care and education establishment does business, there are several ways that business can benefit the economy. In particular, that business creates:

- Income for the business itself (**direct effects**)
- Income for suppliers when it buys materials and equipment, or contracts with, say, an accountant (**indirect effects**)
- Revenue for unrelated businesses when the owner and any employees use their earnings to buy goods or services for themselves (**induced effects**)
- Income for parents who use the early care and education so they can work (**enabling effects**)
- Long-term savings for the public and/or earnings for the children themselves from quality early education (**investment effects**)





Immediate Economic Benefit. The immediate economic benefit of the early care and education industry refers to the ***first three*** types of economic activity: 1) the direct effect, or the actual revenue of early care and education businesses; 2) the indirect effect, which represents economic activity triggered in a region as a result of purchases by early care and education businesses; and 3)

the induced effect, which is the economic activity triggered in other sectors of the economy based on owner and employee earnings (see boxes).[46]

Based on US Bureau of Economic Analysis (BEA) data for Colorado's early care and education industry and 2012 data from the US Census Bureau, Colorado's early care and education industry contributed over **$1.4 billion** to the state economy. Related **earnings** across the economy totaled over **$619 million**, and the statewide economy created more than **32,000 jobs** as a result (see Table 4 for details.)

Table 4. Economic impact of early care and education in Colorado

	Sales/Services *(in millions)*	Earnings *(in millions)*	Employment *(number of jobs)*
Direct Effect	$639.7	$353.7	22,501
Indirect Effect	$295.5	$87.3	3,375
Induced Effect	$504.1	$178.0	6,750
Immediate Economic Benefit	**$1,439.3**	**$619.0**	**32,626**

Source: Effects were calculated using 2015 RIMS II economic multipliers from the Bureau of Economic Analysis and 2012 data from the Census Bureau.[47] See Appendix B for a more detailed explanation of calculations.

The evaluation team calculated these effects and the resulting immediate economic benefit of the early care and education industry to the Colorado economy using regional industry data developed by the US Bureau of Economic Analysis (BEA).[48] This approach to estimating economic impacts is widely used in both the public and private sector.

Another way to think about the impact of a sector on the economy is to look at that industry's economic multipliers, which are developed by economists for each industry and each state. According to this data, in Colorado:

- Every $1.00 dollar spent on early care and education contributes $2.25 to the state's economy
- Every $1.00 earned in the industry generates $1.75 in earnings in other sectors across the state
- Every additional early care and education job generates another 1.45 jobs in other state sectors.[49]

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[46] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[47] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[48] Bureau of Economic Analysis. (2013). *RIMS II: An essential tool for regional developers and planners.* Washington, DC: US Department of Commerce.
[49] Bureau of Economic Analysis. (2015). Table 1.5: Total Multipliers for output, earnings, employment, and value added by detailed industry Colorado (type II) & Table 2.5: Total multipliers for output, earnings, employment, and value added by industry aggregation Colorado (type II).

For comparison purposes, Table 5 displays multipliers for similar industries in Colorado in 2015.[50] The impacts of the early care and education sector are very similar to those of other education sectors, with relatively high contributions to the economy from every dollar spent in the sector, and moderate impacts on earnings and jobs generated statewide relative to other business sectors.

Table 5. Early care and education industry impact on the economy, relative to other Colorado industries

	Every $1.00 *spent* in this industry contributes $____ across all state sectors	Every $1.00 *earned* in this industry generates $____ in earnings across the state economy	Every additional job in the industry generates ____ *jobs* across the state economy
Early care and education	**2.25**	**1.75**	**1.45**
Elementary and secondary schools	2.16	1.69	1.39
Employment services	2.20	1.63	1.54
Colleges, universities, and schools	2.24	1.79	1.76
Home health care services	2.28	1.69	1.62
Hotel and lodging places	1.97	2.03	1.74
Amusement and recreation service	2.15	2.22	1.68
Food services and drinking places	2.19	2.02	1.52

Source: Bureau of Economic Analysis. (2015). Regional Input-Output Modeling System (RIMS II). Regional Product Division: Washington, DC.[51]

Clearly, the early care and education industry in Colorado benefits the state's economy not only through direct revenues, but also by generating economic activity through business and individual employee purchases.

What makes the early care and education industry particularly unique among business sectors, though, is that its impact goes beyond the immediate economic benefit found in most industries.

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[50] Bureau of Economic Analysis. (2015). Table 1.5: Total multipliers for output, earnings, employment, and value added by detailed industry Colorado (type II) & Table 2.5: Total multipliers for output, earnings, employment, and value added by industry aggregation Colorado (type II).

[51] Bureau of Economic Analysis. (2015). Table 1.5: Total multipliers for output, earnings, employment, and value added by detailed industry Colorado (type II) & Table 2.5: Total multipliers for output, earnings, employment, and value added by industry aggregation Colorado (type II).

Because early care and education by its nature enables parents to work who otherwise would need to stay home to care for children, it further increases economic productivity and activity.

Enabling effect of the early care and education sector. Early care and education allows parents to enter the workforce who otherwise would not have the opportunity. We cannot know the exact number of parents who are able to work because their child is in early care and education; however, we can generate a strong estimate.

Parents Going to Work

"Enabling Effect"

Examples:

Parents going to work or school due to the availability of child care

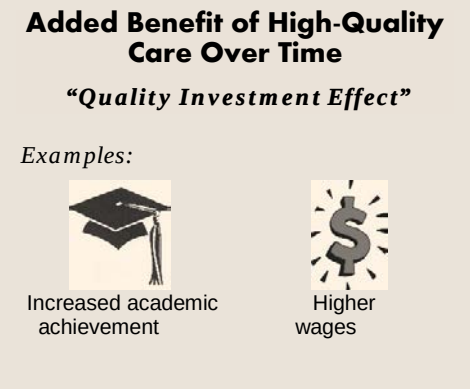
Our approach assumes that one parent per child is enabled to work through early care and education, since in a two-parent household one of the two parents would be able to work whether the family had access to paid early care and education or not and in a single-parent household, the parent needs care to work as the sole income earner. Based on this assumption, we multiplied the number of children birth–4 years old in paid early care and education by the state's median income to determine the total income realized by parents based on access to early care and education. However, since parents must pay for early care and education to work, their realized earnings are less than they would be without that expense, so we have subtracted the cost of early care and education[52] from the total income realized to determine a net income realized.

In 2015, the state's mean income was $51,177, according to the Colorado Department of Labor and Employment.[53] Using data from Table 2 on the estimated number of children birth–4 years old in paid, licensed early care and education (106,259), we estimate that current use of paid, licensed early care and education had an **enabling effect of over $4.4 billion** in 2015. The actual enabling effect is likely considerably higher, since almost an equal number of children are estimated to be in care that is either not paid or not licensed.

Investment effect of high- quality early care and education. In addition to the immediate and enabling effects of the early care and education industry, *high-quality* early care and education, in particular, leads to a number of positive outcomes, which range from short-term benefits, such as increased school readiness and higher academic achievement scores, to long-term effects into adulthood, including higher wages and lower rates of arrests.[54] Some studies have

[52] Cost of care was estimated at 20% of earnings, using an average of percent of income spent on child care from Table 3.
[53] Colorado Department of Labor and Employment. (2017). Labor Market Information Gateway. https://www.colmigateway.com.
[54] Schweinhart, L. J. (2006). Benefits, costs, and explanation of the High/Scope Perry preschool program. Paper presented at the Meeting of the Society for Research in Child Development, Tampa, FL. Retrieved from https://eric.ed.gov/?id=ED475597.

even suggested that investments in high-quality early childhood education deliver a better return than investments in private sector ventures.[55]



Quality early care and education also has an effect on the overall economy, as it results in cost savings in special education, criminal justice, and welfare programs, as well as increased earnings and productivity.[56] Long-term results from the High Scope/Perry Preschool study, a longitudinal randomized research effort, have found that participants with high-quality preschool program experiences had more economic success in adulthood and reduced criminal arrests than their counterparts without high-quality preschool, resulting in public benefits of $105,324 per participant.[57]

Given these findings, the research team calculated an **investment effect** of early care and education, which we define as the economic benefit created from ***high-quality*** early care and education. We calculate this effect by multiplying the total funding for quality early care and education by the economic benefit of quality early care and education (Figure 4).

Figure 4. Investment Effect Calculation

For our analysis, we considered the following criteria to define quality: 1) whether sites had quality ratings of 3, 4, or 5 in the Colorado Shines system; and 2) whether sites were nationally accredited by organizations such as Head Start, National Association for the Education of Young Children, and National Association for Family Child Care. In total, approximately 31% of the 153,178 licensed early care and education slots across the state are in programs that meet one or more of these quality criteria.[58]

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[55] Roinick, A., & Grunewald, R. (2003). Early childhood development: Economic development with a high public return. *The Region*, *17*(4), 6–12.
[56] Light, M. K., Wagner, C. W., Horvath, G., & Wobbekind, R. (2004). Colorado Children's Campaign: The economic impact of child care in Colorado. Retrieved from http://s3.amazonaws.com/mildredwarner.org/attachments/000/000/131/original/report-a1281460.pdf.
[57] Schweinhart, L. J. (2006). Benefits, costs, and explanation of the High/Scope Perry preschool program.
[58] The number of children in child care was estimated based on licensed capacity data received from CDHS in December 2016. These data include each provider's QRIS rating level and licensed capacity. Providers without a quality rating indicated were not included in the enrollment calculation.

Table 6 displays the number of sites and licensed slots that meet each of the three quality criteria.[59]

Table 6. Quality early care and education in Colorado

	Sites	Licensed EC Slots	Percent of Total Slots
All Licensed EC Slots	**4,313**	**153,178**	**100%**
Slots by Quality Category			
Levels 3, 4, or 5	647	46,684	31%
Accreditation	344	25,166	16%
Total Quality Sites*		**47,344**	**31%**

The total number of quality sites and licensed slots are less than the sum of sites and licensed slots because some providers are in more than one quality category.

Assuming that a proportional amount of total early care and education revenue in the state is generated by the 31% of early care and education programs that are high quality, then $198 million of the total $639 million in total direct early care and education revenue is generated within these quality early care and education settings.

Washington State Institute for Public Policy (WSIPP) has estimated that one dollar invested in high-quality early care and education results in $4.20 in economic benefits.[60] This model is the most appropriate one for use in our analysis because it incorporates results from numerous cost-effectiveness studies and applies them to a contemporary statewide ECE context. Using this economic benefit figure in our calculation, we estimate that the total **investment effect** in Colorado is approximately **$832 million** ($198 million x $4.20 = $832 million).

[59] Data on quality ratings and accreditation were provided by the Colorado Department of Human Services (CDHS) in February 2017.

[60] Kay, N., & Pennucci, A. (2014). Early childhood education for low-income students: A review of the evidence and benefit-cost analysis (Doc. No. 14-01-2201). Olympia: Washington State Institute for Public Policy.

In other words, annual investments in high-quality early care and education in Colorado adds an additional $832 million into the state economy in short- and long-term benefits from such factors as increased school readiness and higher academic achievement, higher adult wages, and lower rates of arrests.

What industries are comparable in size to early childhood?

Revenue[i]

- Women's clothing stores
- Advertising agencies
- Scientific research & development services

Number of employees[ii]

- Mining
- Heavy & civil engineering construction

Wages[ii]

Childcare workers' wages are similar to . . .

- Telemarketers
- Short order cooks
- Hairstylists

Child care administrators' wages are similar to . . .

- Retail sales supervisors
- Postal service clerks

i Light, M. K., Wagner, C. W., Horvath, G. & Wobbekind, R. (2004). Colorado Children's Campaign: The Economic Impact of Child Care in Colorado.
ii Colorado Labor Market Information (LMI) Gateway. (2017).

Relative Scope of the Early Childhood Sector in Colorado

As described earlier, the total revenue from Colorado's early care and education sector in 2014 was $639.7 million. The Gross State Domestic Product (GSDP) in Colorado was $306.7 billion in 2014[61]. GSDP is essentially a measure of statewide total revenue in the economy. At $353.7 million, the early childhood sector made up approximately 0.2% of Colorado's GDP in 2014.

National figures show that the early childhood industry generates similar revenue to that of women's clothing stores, advertising agencies, and scientific research and development services.[62]

With 22,501 employees in 2014, Colorado's early care and education industry made up approximately 0.01% of nonagricultural employment in 2014.[63] Early care and education employs a similar number of people as mining or heavy and civil engineering industries do; however, wages of early childhood workers are more similar to low-paid service jobs, such as hairstylists and short order cooks. Even early care and

[61] Business Research Division, Leeds School of Business, University of Colorado Boulder. (2016). *Colorado business economic outlook 2016*.
[62] Light, M. K., Wagner, C. W., Horvath, G., & Wobbekind, R. (2004). Colorado Children's Campaign: The economic impact of child care in Colorado.
[63] Calculated using non-agricultural employment numbers from: Business Research Division, Leeds School of Business, University of Colorado Boulder. (2016). *Colorado business economic outlook 2016*.[64] Colorado Labor Market Information Gateway. (2017). Retrieved from https://www.colmigateway.com.

education administrators have relatively low wages that are comparable to retail sales supervisors and postal service clerks.[64]

> "The child care industry in the US consists of a large network of mostly very small businesses. Most child care providers are home-based businesses operated by a sole proprietor. However, most children are served by larger, more organized child care centers."
>
> *Child Care in State Economies, 2015*

While the overall size of the early care and education industry in Colorado is relatively modest, its function is critical to the economic well-being of the state economy. Unlike other industries of its size or larger, early care and education has enabling (allowing parents to work) and long-term human investment effects that increase the scope of its economic impact.

Growth of the Early Care and Education Industry

The *demand* for early care and education relies on a number of factors, including demographic trends, the cost of care, the participation rate of women in the labor force, the number of single-parent households, and births to unmarried mothers.[65] On the flip side, the *growth* of the industry is dependent not only on demand, but also on wage rates, expected changes in requirements to enter the industry, and other economic and industry-specific trends.[66] The Bureau of Labor Statistics calculates employment projections for all industries using complex regression and trend models that incorporate demand and growth factors that are informed by industry expert advice about developments affecting growth patterns. This section draws on these projections to examine the expected demand for early care and education over the next ten years and the potential ability of the industry to meet that demand.

Expected demand for early care and education. According to the Colorado Department of Local Affairs, Colorado's population of children between birth and age 14 is expected to increase by 5% between 2016 and 2021 and by 13% between 2016 and 2026. The greatest increases will be among children age birth through 4, where the population is expected to increase by roughly 10% by 2021 and almost 22% by 2026.[67]

> Colorado's population of 0–4-year-olds will increase by about **10%** by 2021, and by almost **22%** by 2026.
>
> Colorado Department of Local Affairs, State Demography Office (2016)

To estimate increased demand for early care and education, we have calculated the number of children age 0–4 that this expected population increase

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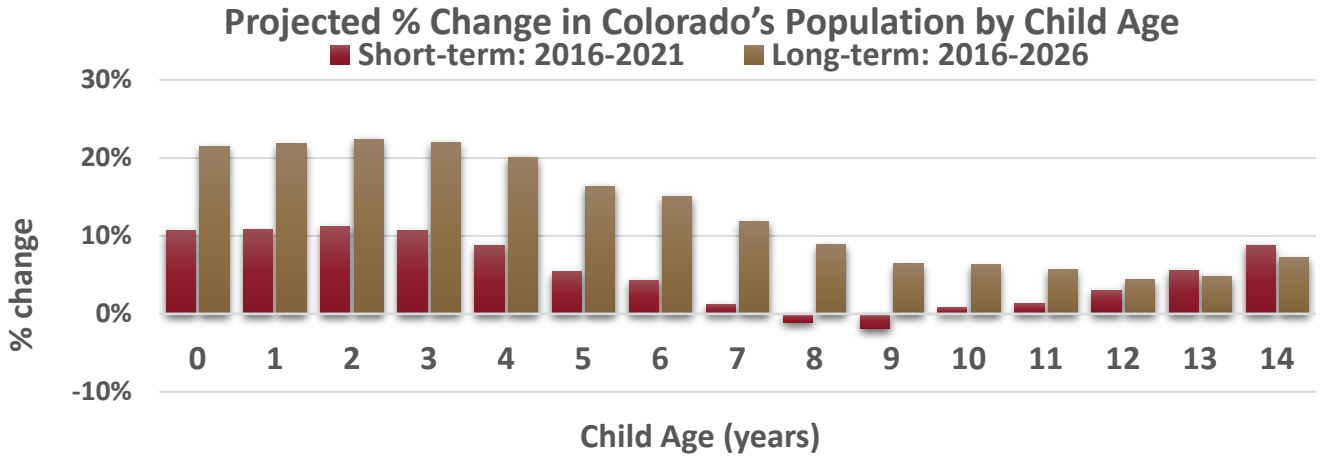
[64] Colorado Labor Market Information Gateway. (2017). Retrieved from https://www.colmigateway.com.
[65] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[66] Bureau of Labor Statistics, Employment Projections Methodology. Retrieved 2/24/2017. https://www.bls.gov/emp/ep_projections_methods.htm#labor.
[67] Colorado Department of Local Affairs, State Demography Office. (2016). Single Year of Age Data: 1990–2014 (Estimates) and 2015-2050 (Forecast). Retrieved from https://storage.googleapis.com/co-publicdata/sya-region.csv

represents for Colorado and multiplied that increase by the percentage of children who currently participate in paid early care and education.

Census data indicate that the total population of the state was 5,456,574 in 2015, of which 332,851 were children under 5 years old.[68] Given these figures, the projected growth rates in the birth to 4-year-old population suggest that Colorado will have an additional 33,285 children birth–4 by 2021 than we do now and an additional 73,227 children in that age range by 2026. [69] Currently, 32.5% of children ages 0–4 are in paid early care and education.[70] If paid early care and education participation rates remain constant, the system will need to accommodate an additional 10,818 children birth–4 by 2021 and an additional 23,799 children by 2026.

Figure 5. Projected increase in child population



Expected capacity of early care and education industry. According to data from the Bureau of Labor Statistics (Table 7), the estimated percent increase in the number of job openings for preschool teachers and administrators over the next ten years is more than 42%, while the increase in the number of job openings for childcare workers is expected to be about 33%.[71,72,73] Continued low wages for early care and education professionals, combined with increased

[68] Current population estimates are from the US Census Bureau's American Community Survey, 1-year estimates for 2015 for the State of Colorado.
[69] Estimates of the projected change in Colorado's population by age are based on projected population statistics from: Colorado Department of Local Affairs, State Demography Office. (2016). Single Year of Age Data: 1990–2014 (Estimates) and 2015–2050 (Forecast). Retrieved from https://storage.googleapis.com/co-publicdata/sya-region.csv.
[70] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success. Data are from the US Census Bureau, Current Population Survey – March Supplement (2010–2014). State shares are estimated using the percentage of children ages 0–4 and 5–14 reported as participating in paid child care in the Current Population Survey based on a five-year average share in the 2010–2014 period.
[71] Colorado Department of Labor and Employment. (2016). *Occupational Projections (Short-term) for Multiple Occupations in Colorado in 2016-2018*. Available from https://www.colmigateway.com
[72] Colorado Department of Labor and Employment. (2016). *Occupational Projections (Long-term) for Multiple Occupations in Colorado in 2015-2025*. Available from www.colmigateway.com
[73] Bureau of Labor Statistics, Office of Occupational Statistics and Employment Projections. (2016). *Projections Methodology*. Retrieved from https://www.bls.gov/emp/ep_projections_methods.htm#labor

educational demands for occupational entry or progression, may make it difficult for the industry to fill these jobs without changes in pay to bring early care and education professional salaries to parity with similar care and education professions.

Table 7. Employment projections for Colorado's early care and education occupations

	Estimated/Projected Employment				Employment Change		Percent Change	
Occupation	2015	2016	2018	2025	2016-2018	2015-2025	2016-2018	2015-2025
Childcare Workers	13,415	13,947	14,847	17,883	900	4,468	6.45%	**33.31%**
Education Administrators, Preschool and Childcare Center/Program	703	714	761	1,005	47	302	6.58%	**42.96%**
Preschool Teachers, Except Special Education	7,688	7,802	8,329	10,967	527	3,279	6.75%	**42.65%**

Colorado Department of Labor and Employment. (2016). *Occupational Projections (Short-term) for Multiple Occupations in Colorado in 2016-2018*. Available from https://www.colmigateway.com; Colorado Department of Labor and Employment. (2016). *Occupational Projections (Long-term) for Multiple Occupations in Colorado in 2015-2025*. Available from https://www.colmigateway.com

In particular, within the early care and education industry in Colorado and nationally there has been an effort to increase the quality of early care and education through increased expectations for worker training and education. These quality improvement efforts are intended to benefit children in both the short- and long-term, as described earlier in this report.[74] Without a simultaneous increase in the average wage of early care and education workers, workforce retention is likely to suffer.[75] To the extent that the early care and education workforce pursues less educationally demanding or higher wage jobs, labor supply may not be able to keep up with the number of projected job openings.

Takeaways: Impact on the Economy

- Colorado is among the top ten *least* affordable states for early care and education, yet public funding for services is lower than the national average.
- The average annual income of childcare workers is just above the poverty threshold for a family of four and well below self-sufficiency standards for one adult, one preschooler, and one school-age child.
- In 2014, Colorado's early care and education sector generated $639.7 million in revenue, comparable to women's clothing stores and the advertising industry.
- Every dollar spent on early care and education services contributed $2.25 to the state's economy.
- The early care and education industry is unique because it enables parents to work, generating over $4.4 billion in earnings across the economy.

[74] Colorado Early Childhood Leadership Commission P-3 Task Force. (2010). *Colorado's Early Learning Professional Development System Plan*. Denver, CO.
[75] Phillips, D., Austin L., & Whitebook, M. (2016). *The early care and education workforce*. The Future of Children, 26(2).

CHAPTER 2: The Cost of Early Care and Education in Colorado

Early Care and Education Funding in Colorado

The previous section described the role of the early care and education sector in the state's economy. We presented information about the economic impacts of early care and education on the state economy, including direct, indirect, induced, enabling, and investment effect. We also compared the role of the early care and education industry relative to other industries in the state and examined the possible need for industry growth to meet future demand over the next ten years.

In the current section, we explore ***how early care and education is funded in Colorado***. In particular, we examine the following questions:

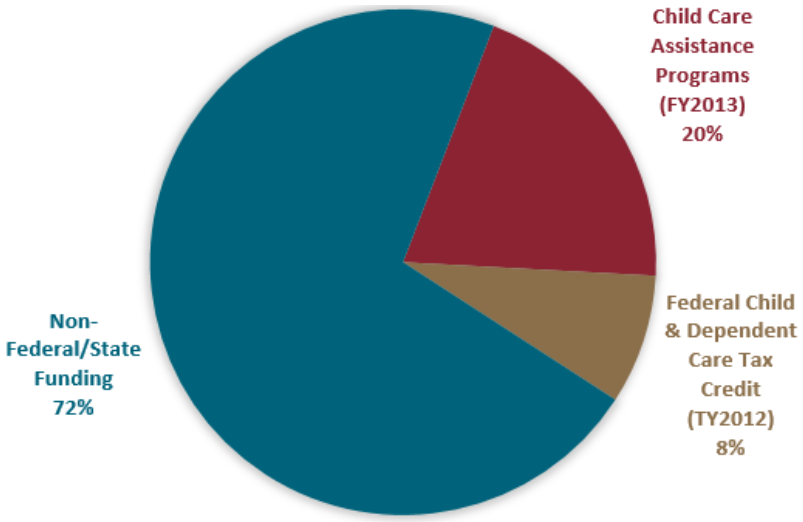
- Who is currently paying for childcare and early learning?
- What drives provider costs?
- What is the gap between the cost of quality services and available sources of revenue?

This section provides answers to these questions.

Who Pays for Early Care and Education?

Federal and state funding. Of the $639.7 million that Colorado's early care and education industry generated in 2014, 28% was paid for by federal state pass-through funding sources, including 8% from the Federal Child & Dependent Care Tax Credit and 20% from federal early care and education assistance programs that pass through the state, such as the Child Care Assistance

Figure 6. Early care and education funding in Colorado

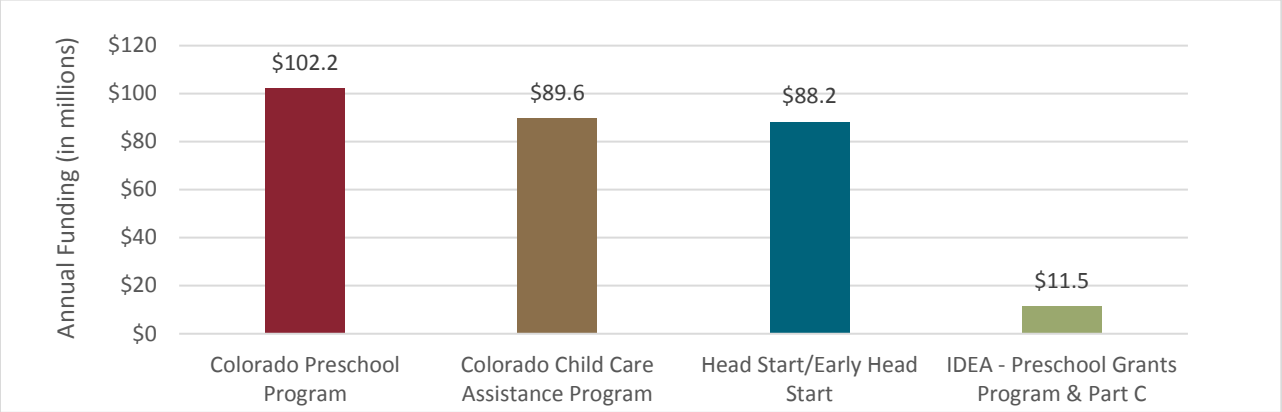


Program and Head Start/Early Head Start.[76]

In Colorado, there are at least 45 distinct sources of funding related to early childhood education, including a variety of federal and state sources.[77] Some of these support families to cover tuition costs, while the rest pay for the infrastructure of the early childhood system (such as funding for Child Care Resource and Referral agencies), professional development and quality improvement for providers, or regulation of the industry to ensure child safety.

Figure 6 shows sources of revenue for early care and education in Colorado. Most funding (72%) comes directly from families in the form of tuition payments. Figure 7 highlights the primary programs in Colorado that reduce the cost of care for families with children ages 0–5. As shown, the largest single source of funding is the Colorado Preschool Program. Other funders that support the direct cost of early care and education include the Colorado Child Care Assistance Program (CCCAP) and Head Start and Early Head Start (HS/EHS). Funding amounts represent the latest year for which data are available.[78]

Figure 7. Early care and education assistance funding sources in Colorado



Non-federal/state funding sources. While federal and state government programs accounted for 28% of revenue in Colorado's early care and education industry in 2014, other sources paid the remaining 72%.[79] Funding sources for the remaining 72% include parent fees and/or tuition assistance from early care and education programs, and, sometimes, local funding sources (such as the taxpayer-funded Denver Preschool Program). Table 8 demonstrates the possible private

[76] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[77] Heintz, L. (2016, unpublished). *Early childhood workforce policy and program scan.* Denver, CO: Clayton Early Learning.
[78] Heintz, L. (2016, unpublished). *Early childhood workforce policy and program scan.* Denver, CO: Clayton Early Learning.
[79] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.

funding in Colorado for a family if their costs reflect the industry revenue cost-sharing percentages of 72% private pay and 28% federal/state funding.

Table 8. Early care and education cost sharing scenario[80]

	Average Tuition	State/Federal Public Funding *(28%)*	Private Pay *(72%)*
Average Annual Costs of Early Care and Education			
Infant Care – Center	$13,143	$3,680	$9,463
Infant Care – Home	$8,817	$2,469	$6,348
4-Year Old Care – Center	$9,871	$2,764	$7,107
4-Year Old Care – Home	$8,183	$2,291	$5,892

This scenario is demonstrative only and does not reflect the full range of possible cost-sharing scenarios that a family might experience. Many of the public funding sources for early care and education assistance are only available to families below certain income thresholds (set individually by counties in Colorado) and others are only available to families whose children are identified as "at-risk" for school failure. Many families do not meet these criteria and so either pay the full cost of tuition themselves or select more affordable early care and education arrangements that may be unlicensed or of lower quality.

Cost Drivers for Early Care and Education Providers

Early care and education cost drivers. Not surprisingly, providing high-quality early care and education costs more than providing lower quality care. A number of factors drive the cost of providing quality care, including increasing the number of providers as a ratio to children, paying for and/or developing increased skill in the workforce, and providing materials, curriculum, supplies, and infrastructure to support quality.[81] Additionally, cost is driven by the geographic **region** where a provider is located, provider **size**, **quality level**, and **salaries**, and whether the provider **serves infants.** This section describes these key cost drivers for early care and education establishments, while the subsequent section explores how each one impacts providers' ability to balance revenues and expenses.

Region: Colorado has 64 counties that include urban, plains, and mountain areas; the cost of living by county varies significantly based on a range of geographic, demographic, and economic factors. A 2015 study of early care and education market rates in Colorado categorized counties into groups based on their cost of living index relative to the state benchmark of 100.[82] County

[80] Tuition amounts from: RegionTrack, Inc. (2015). *Child care in state economies*. Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.
[81] Qualistar Colorado and Colorado Children's Campaign. (2014). *Child care affordability in Colorado: An investigation into child care costs and recommended strategies for improving affordability*. Denver, CO: The Women's Foundation of Colorado.
[82] Moldow, E., Velez, C., O'Brien, T., Walters, B., Krebill-Prather, R., and Carlson, B. L. (2015). 2015 Colorado child care market rate study. University of Colorado Denver: The Evaluation Center, School of Education and Human Development.

groups are categorized in Table 9, with counties listed in each grouping by their relative distance from the benchmark (i.e., Pitkin has the highest cost of living in the state, while Kiowa has the lowest). In the next section of this report, we have modeled three representative counties that reflect high, mid-range, and low cost-of-living scenarios. While specifics about market rates, Colorado Child Care Assistance Program (CCCAP) reimbursement rates, and salaries may vary within cost-of-living categories, the three representative counties provide an accurate picture of how cost of living factors impact the cost of care across the state.

Table 9. County groupings by cost of living index

Cost of Living	Colorado Counties
Very High More than 10% above the benchmark	Pitkin, Summit, Routt, San Miguel
High From 5% to 10% above the benchmark	Eagle, Denver, Grand, Boulder
Mid-Range Within 5% above and below the state benchmark	Broomfield, Hinsdale, La Plata, Garfield, Gunnison, Jefferson, Clear Creek, Ouray, Lake, Douglas, San Juan, Park, Arapahoe, El Paso, Larimer, Mineral, Moffat, Teller, Adams, Elbert, Chaffee, Gilpin
Low From 5% to 10% below the benchmark	Morgan, Delta, Custer, Weld, Mesa, Rio Blanco, Pueblo, Montrose, Logan, Montezuma, Rio Grande, Alamosa, Fremont, Jackson, Archuleta, Kit Carson
Very Low More than 10% below the benchmark	Dolores, Phillips, Costilla, Las Animas, Saguache, Huerfano, Lincoln, Washington, Sedgwick, Yuma, Otero, Cheyenne, Conejos, Bent, Crowley, Prowers, Baca, Kiowa

Moldow, E., Velez, C., O'Brien, T., Walters, B., Krebill-Prather, R., and Carlson, B.L. (2015). *2015 Colorado Child Care Market Rate Study*. University of Colorado Denver: The Evaluation Center, School of Education and Human Development.

Size: Early care and education establishments can range from sole-proprietorships to large entities. According to Colorado Department of Human Services (CDHS) licensing data, the state's smallest providers are licensed to serve as few as two children, while the largest are licensed to serve up to 461 children.[83] Larger providers have higher costs, but also enjoy some economies of scale that can lower per unit expenses.[84] A provider's size has a significant effect on its ability to create a successful business model. Small providers may have difficulty in

[83] Colorado Department of Human Services - Office of Early Childhood. (2017). CDHS licensed child care. Retrieved Nov. 16, 2016 from https://data.colorado.gov/Human-Services/Colorado-Licensed-Child-Care-Facilities-Monthly-Re/a9rr-k8mu.
[84] Silverstein, P., & Hansen, D. (2012). Promoting efficiency and quality in the child care market: The return on investment of the early learning ventures shared services model. Denver, CO.

achieving the economies of scale necessary to be financially sustainable, especially at higher quality levels.

In order to better understand the economic realities of providing early care and education for providers of various sizes, we developed cost models for several example types of providers. The following table indicates the number of classrooms and total number of children birth through 4 for typical small, medium, and large providers. Note that the number of children varies by quality rating level, since establishments with higher quality ratings are meeting standards for lower teacher-t0-child ratios.

Table 10. Early care and education provider size categories

Size	# Classrooms	# Children (QRIS Levels 1–3)	# Children (QRIS Levels 4–5)
Small	3	44	36
Medium	5	78	66
Large	9	160	136

***Note**: Higher quality establishments have lower teacher-t0-child ratios, so class sizes go down as quality goes up.*

Quality level: Colorado has adopted a tiered system of quality rating for licensed early care and education providers called Colorado Shines. Under this system, quality ratings are embedded in licensing, so that any program meeting all licensing criteria has at least a level 1 in the five-tiered rating structure. Providers may then apply for a higher rating as described in Table [85]. We used these ratings as the basis for modeling cost of quality.

Table 11. Colorado Shines rating levels

Rating Level	Criteria
Level 1	• Meet all requirements of the CDHS Division of Early Care and Learning licensing
Level 2	• Complete Colorado Shines QRIS Level 2 training requirements • Ensure enrollment of staff in the Colorado Shines Professional Development Information System • Conduct a self-assessment and meet all the core quality indicators in that assessment • Develop a quality improvement plan

[85] Colorado Office of Early Childhood. (2015). *Colorado Shines program guide.* Denver, CO: Colorado Department of Human Services.

Rating Level	Criteria
Levels 3-5	• Earn points toward a level 3–5 rating by showing verified evidence of quality in five areas (workforce qualifications and professional development; family partnerships; leadership, management & administration; learning environment; and child health) • Meet threshold scores from the Environmental Rating Scale, based on an observation by an independent, reliable observer • Develop a quality improvement plan based on results from the assessor observation

Salaries: Salaries for early care and education professionals vary by experience levels and job classification. Workers classified as Childcare Workers in national and state employment data earn different wages from those who are classified as Preschool Teachers. According to data from the Labor Market Information Gateway, the average difference in salaries by experience level can be almost $10,000 annually for Childcare Workers and more than $14,000 annually for Preschool Teachers.[86] Preschool Teachers, on entry, earn approximately $1,600 more per year than Childcare Workers. For experienced early care and education professionals, the difference in pay across job classifications is over $6,500 annually (Table 12).

Table 12. Early care and education salaries by experience level and job classification

Experience Level	Childcare Workers	Preschool Teachers	Difference
Average annual wage or salary (2015)			
Entry	$18,880	$20,544	($1,664)
Mean/Average	$25,065	$29,998	($4,933)
Experienced	$28,157	$34,725	($6,568)
Average hourly wage (2015)			
Entry	$9.08	$9.88	($0.80)
Mean/Average	$12.05	$14.42	($2.37)
Experienced	$13.54	$16.69	($3.15)

Colorado Department of Labor and Employment. (2016). *Occupational Employment and Wage Rates (OES) for Multiple Occupations in Colorado in 2015.* Available from www.colmigateway.com

Geography also plays a role in salaries. Table 13 shows average annual salaries for seven different metropolitan statistical areas in Colorado, ranked smallest to largest by the size of the difference in average salaries for preschool teachers versus childcare workers.[87]

[86] Colorado Department of Labor and Employment. (2016). *Occupational employment and wage rates (OES) for multiple occupations in Colorado in 2015.* Available from www.colmigateway.com.
[87] Colorado Department of Labor and Employment. (2016). *Occupational employment and wage rates (OES) for multiple occupations in all metropolitan statistical areas in Colorado in 2015.* Available from www.colmigateway.com.

Table 13. Early care and education salaries, by geography and job classification

Metropolitan Statistical Area (MSA) Name	2015 Mean Annual Wage for Childcare Workers	2015 Mean Annual Wage for Preschool Teachers	Difference
Greeley	$22,455	$26,438	($3,983)
Denver - Aurora	$25,732	$29,774	($4,042)
Fort Collins - Loveland	$20,903	$26,581	($5,678)
Colorado Springs	$23,435	$29,625	($6,190)
Boulder-Longmont	$25,948	$32,328	($6,380)
Pueblo	$21,880	$32,597	($10,717)
Grand Junction	$21,077	$34,203	($13,126)

Colorado Department of Labor and Employment. (2016). *Occupational Employment and Wage Rates (OES) for Multiple Occupations in All Metropolitan Statistical Areas in Colorado in 2015.*

Infants: The cost of serving infants and toddlers is higher than the cost of serving older children, since infants require lower staff-to-child ratios and smaller group sizes than do preschoolers. In Colorado, regulations require a staff-to-child ratio of 1:5 and a group maximum of ten for the care of infants and toddlers. By comparison, the ratio and group size double for classrooms with children who are 3–4 years old. Classrooms that serve mixed-age groups must meet staffing ratios and group sizes related to the youngest 20% of children in the group (or the youngest child in the case of infants and toddlers).[88]

Table 14. Staff-child ratios and group sizes by child age

Ages of Children	Staff-to-Child Ratio	Maximum Group Size
6 weeks to 18 months *(infants)*	1:5	10
12–36 months	1:5	10
24–36 months	1:7	14
2½–3 years	1:8	16
3–4 years	1:10	20
4–5 years	1:12	24

Note: *The staff ratio/maximum group size for the youngest child must be utilized if more than 20% of the group is composed of younger children. This does not apply to infants and toddlers. The ratio/group size for toddler groups is based on the youngest child in the group. Source: 7.702 Rules Regulating Child Care Centers (Less than 24-Hour Care).*

Early Care and Education Cost Estimates for Colorado

To estimate costs for different types of early care and education providers, we adapted an early care and education cost model developed by Louise Stoney and Libby Poppick[89], using current

[88] Colorado Child Care Facility Licensing Rules: 7.702 Rules Regulating Child Care Centers (Less than 24-Hour Care). http://media.wix.com/ugd/97dde5_48385d6738784229b1fc238f5e2a6dc0.pdf.

[89] The Stoney and Poppick model and supporting materials were developed as part of a report to the HB14 – 1317 Joint Task Force, February 2016.

Colorado data about regional cost of living, provider size, quality ratings, salaries, and staffing ratios that have been presented here. In addition, the model includes calculations related to staff **turnover rates** and **bad debt**, which both strongly impact business costs and profitability. The research literature has shown turnover rates within the early care and education industry that range from 15–30%.[90] Similarly, industry standards for bad debt (unpaid tuition that providers are unable to collect) are 3% or less.[91] All model assumptions are detailed in Appendix A.

Base Model Assumptions

Region:	*Mid-range cost of living*
Center Size:	*Medium, 5 classrooms*
Infants/Toddlers:	*Yes*
Turnover:	*30%*
Bad Debt:	*3%*
Subsidized Slots:	*30%*
Market Rates:	*40th–60th percentile of regional range based on quality level*
Lead Teacher Salaries:	*Average childcare worker salary adjusted for quality levels*

Expenditures within the model are based on both personnel and non-personnel expenses.

- ***Personnel expenses*** are based on the total number of staff required and the estimated wages of each type of staff. For example, different wage estimates are used for lead teachers, teacher assistants, and directors. The number of staff required is based on the provider's size and group size assumptions for each quality level.
- ***Non-personnel expenses*** include site-level costs and child-level expenses. Site-level costs include rents, utilities, and maintenance, and are based on the site's square footage. Child-level expenses include food, equipment and supplies, and other costs that vary based on the number of children at the site.

Base Model: In order to understand costs and revenues for typical providers, we created a base model of an individual provider. This model assumes a medium-sized provider with five classrooms (including an infant classroom) located in a part of the state with mid-range cost of living expenses.

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[90] Whitebook, M., Phillips, D., & Howes, C. (2014). Worthy work, STILL unlivable wages: The early childhood workforce 25 years after the National Child Care Staffing Study. Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley.

[91] National Center on Child Care Quality Improvement. (2014). *Early care and education program characteristics: effects on expenses and revenues.* Washington, DC: Administration for Children and Families, Office of Child Care.

For this model, which is our base model, we used wage estimates for the mid-range community[92] and assumed a 30% teacher turnover rate and 3% bad debt (unpaid tuition) as part of our calculations. We assumed that 30% of families paid with Colorado Child Care Assistance Program dollars and the remaining 70% paid at the market rate, reflecting the state revenue distribution between public and private pay. We also assumed that market rates increase only modestly based on quality level, consistent with literature that suggests families cannot readily distinguish quality differences to make price-point decisions[93, 94, 95]. Based on this assumption, we used market rates from the 2015 Colorado Child Care Market Rate Study[96] to calculate market rates at the 40th percentile for the region for quality levels 1 and 2, at the 50th percentile for level 3, and at the 60th percentile for levels 4 and 5.

Table 15 shows the estimated costs and revenues for the ***base model***. Expenses in this model increase steadily as quality levels increase. This reflects assumptions that personnel and non-personnel expenses rise at each level of quality to pay for the increased costs of lower child-staff ratios, more highly trained teachers, better physical facilities and materials, and increased use of child assessments to guide instruction and programming. Revenue changes by quality level are a reflection of Colorado Child Care Assistance Program (CCCAP) reimbursement rate structures and prevailing market rates in the county, adjusted moderately for quality.

Table 15. Costs and revenues for medium-sized provider[97]

		Revenues			
Rating Level	**Expense**	**Public***	**Parents**	**Total**	**Profit/Loss**
Level 1	$603,134	$186,037	$434,519	$620,556	**$17,422**
Level 2	$648,308	$186,037	$434,519	$620,556	**−$27,752**
Level 3	$745,528	$236,776	$471,337	$708,113	**−$37,415**
Level 4	$760,883	$238,062	$428,327	$666,389	**−$94,494**
Level 5	$789,508	$239,042	$428,327	$667,369	**−$122,139**

***Note: For purposes of modeling public revenue sources, we used Colorado Child Care Assistance Program (CCCAP) funding structures and reimbursement rates. We did not model separately for sources such as the Colorado Preschool Program or Head Start.*

Under the base model, providers at a level 1 quality rating have a ***net revenue gain*** of $17,422, while providers at all other quality levels experience a ***net revenue loss***. The greatest revenue gaps occur at quality levels 4 and 5, where lower child-staff ratios and higher teacher wages for

[92] Colorado Department of Labor and Employment. (2017). Labor Market Information Gateway.
[93] Culkin, M., Morris, J., & Helburn, S. (1991). Quality and the true cost of child care. *Journal of Social Issues*, *47*(2).
[94] Waite, L., Leibowitz, A., & Witsherger, C. (1991). What parents pay for: Child care considerations, quality and cost. *Journal of Social Issues*, *47*(2).
[95] Camasso, M., & Roche, C. (1991). The willingness to change to formalized child care arrangements: Parental considerations of cost and quality. *Journal of Marriage and Family*, 53.
[96] Moldow, E., Velez, C., O'Brien, T., Walters, B., Krebill-Prather, R., & Carlson, B. L. (2015). 2015 Colorado child care market rate study. University of Colorado Denver: The Evaluation Center, School of Education

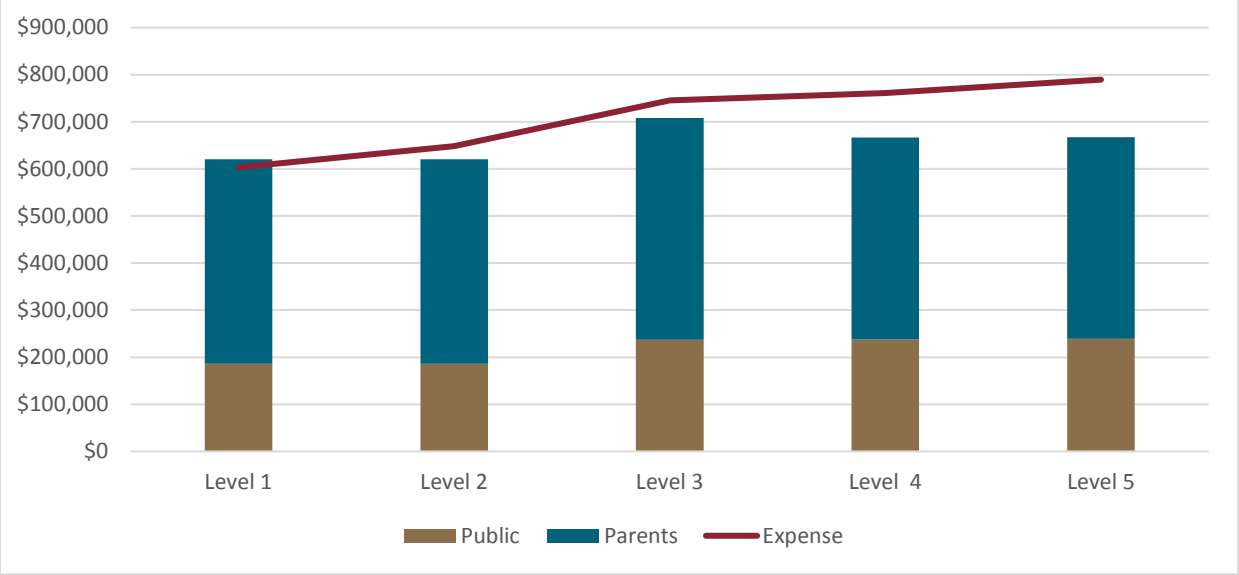
[97] The costs and revenues presented here represent providers with wages at the state average and assume that 30% of children are receiving CCCAP subsidies, reflecting the percent of public funding for child care in Colorado.

more qualified staff result in lower revenues but greater expenses than at lower quality levels (that is, these businesses can serve fewer children, but it costs more to serve each one). High-quality centers are higher quality in large part because they have fewer children per adult and more highly skilled adults. These factors are desirable for better early care and education and related child outcomes; however, they are not fiscally sustainable for businesses.

It should be noted, too, that even though the model accounts for higher staff wages at high-quality establishments, these wages are still near poverty thresholds and far below K–12 teacher salaries, which we discuss later in this report. In other words, high-quality early care and education establishments are attaining their quality at the expense of their workforce, which continues to make low wages even when they attain greater skills and education that benefits the child outcomes.

Figure 8 shows the base model in graphic form, where the revenue and expense gaps, especially at high-quality levels, are visually evident. Note that revenue goes down at the highest quality levels (4 & 5) because the child-teacher ratio is lower and so establishments at these levels can serve fewer children.

Figure 8. Base model revenues and expenses



These findings are similar to patterns seen in previous modeling of Colorado early care and education provider costs, which have noted greater losses at higher quality levels.[98] The current model, though, reflects recent changes to Colorado Child Care Assistance Program (CCCAP) reimbursement rates in many counties that reward higher quality levels with larger subsidies. A later section discusses the impact of these regional variations in reimbursement rate structures

[98] Light, M. K., Wagner, C. W., Horvath, G., & Wobbekind, R. (2004). Colorado Children's Campaign: The Economic Impact of Child Care in Colorado.

and how those rates can, if structured appropriately, incentivize provider efforts to improve quality.

The following sections demonstrate differences in net revenues/losses based on changes in provider factors that affect profitability and quality.

Regional Variations: From an early care and education industry perspective, the primary cost differentiators across regions is salaries and non-personnel expenses, while the primary revenue differentiators across regions are subsidy structures and market rates for tuition. We modeled the cost variation across Colorado counties by adjusting salaries according to regional means for three representative counties that fall within the high, mid-range, and low regions detailed in Table 9[99] We also varied non-personnel expenses by the cost of living index for each region. The cost of living index is computed by the Colorado State Demographer and is based on a market basket of goods and services that includes housing, transportation, food, health care, and other goods.[100]

We modeled the revenue variations as a function of regional differences in CCCAP reimbursement rates and market rates. CCCAP is not the only public subsidy available for early care and education in Colorado; however, it is an effective proxy for other public funding that can also be woven into a provider's revenue model, such as the Colorado Preschool Program or Head Start.

Table 16 displays net revenues and losses for our base model provider operating in three regions throughout the state: Denver County, with a cost of living about 10% higher than the state average; El Paso County, with a cost of living close to the state average; and Mesa County, with a cost of living about 6% lower than the state average. Shaded cells show net losses, with increasing losses shaded darker as the losses progress.

[99] Colorado Department of Labor and Employment. (2017). Labor Market Information Gateway.
[100] More information about the COLI is available from the Council for Community and Economic Research (C2ER) at coli.org.

Table 16. Estimated provider net revenue by Cost of Living Index (COLI) category and quality level[101]

Rating Level	High COLI (Denver)	Mid-range COLI (El Paso)	Low COLI (Mesa)[102]
Level 1	$103,483	$17,422	–$84,356
Level 2	$45,036	–$27,752	–$112,613
Level 3	$13,135	–$37,415	–$176,944
Level 4	–$48,703	–$94,494	–$263,070
Level 5	–$76,321	–$122,139	–$290,003

Across all regions, providers struggle to make ends meet, especially at higher quality levels, where expenses far exceed revenues from tuition and public subsidies. The difference between regions is driven by a number of factors, including the mix of subsidy reimbursement and market rates, the cost of living, and staff wages. Providers in Denver are able to break even or even make a profit when they operate at quality levels 1–3 largely because the mix of CCCAP reimbursement and market rates at those levels exceed expenses and make up for higher cost of living factors that might otherwise result in a net loss.

Level 1 providers in El Paso County are also able to make a small profit under the base model; however, the combination of CCCAP reimbursement structures and market rates cannot keep up with expenses past this lowest level of quality in that county.

By contrast, the low cost-of-living scenario in Mesa County points out the difficulty of providing early care and education in regions where both the subsidy reimbursements and the tuition rates are extremely low. Table 17 shows the CCCAP and market rates for four-year-olds in each of our representative cost-of-living scenario counties. While the cost-of-living in Mesa is about 6% below the state average (represented by our mid-range county, El Paso), their subsidy rates are 15–40% lower, with the gap increasing at higher quality levels. Similarly, under our modeled scenario, market rates in Mesa are also 25–33% lower than the state average. In other words, the amount the market and the county are willing to pay for early care and education in the low cost-of-living scenario is significantly below what would be expected just based on cost-of-living differences for that region.

In Denver, by comparison, market and subsidy rates for four-year-olds at levels 1 and 2 are 18% above the state average, meaning they exceed the expected 10% cost-of-living difference. Average market rates in Denver, reflected at a level 3 quality rating, are also 18% higher than the state average.

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[101] Cost of Living multipliers were based on the midpoint for each COLI category, and were as follows: Very high: 120% state average; High: 107.5% state average; Mid-Range: 100% state average; Low: 92.5% state average; Very low: 85% state average

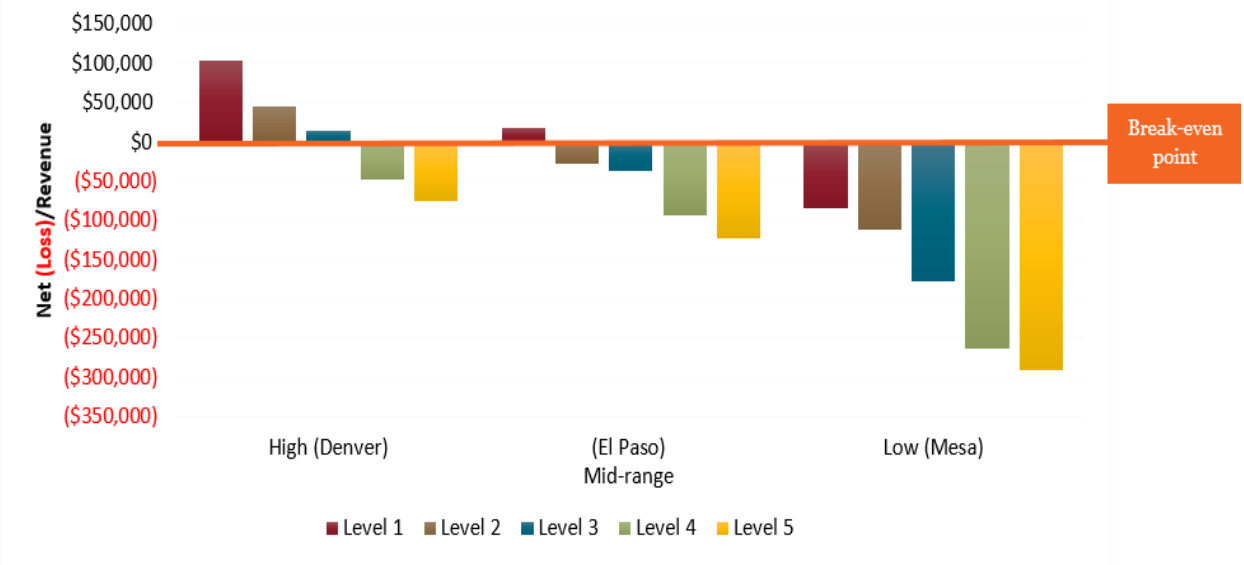
[102] Subsidy rates for Mesa County are based on the base rate, not including an additional adjustment for fees and absences.

Table 17. Regional CCCAP and market rates for 4-year-olds

Quality Level	Denver		El Paso		Mesa	
	Subsidy	Market	Subsidy	Market	Subsidy	Market
Level 1	$31.50	$41.63	$26.74	$35.20	$22.84	$26.54
Level 2	$32.00	$41.63	$26.74	$35.20	$22.84	$26.54
Level 3	$39.00	$44.89	$38.08	$38.08	$27.76	$27.76
Level 4	$45.75	$49.13	$47.81	$41.97	$28.73	$28.15
Level 5	$46.25	$49.13	$47.81	$41.97	$28.73	$28.15

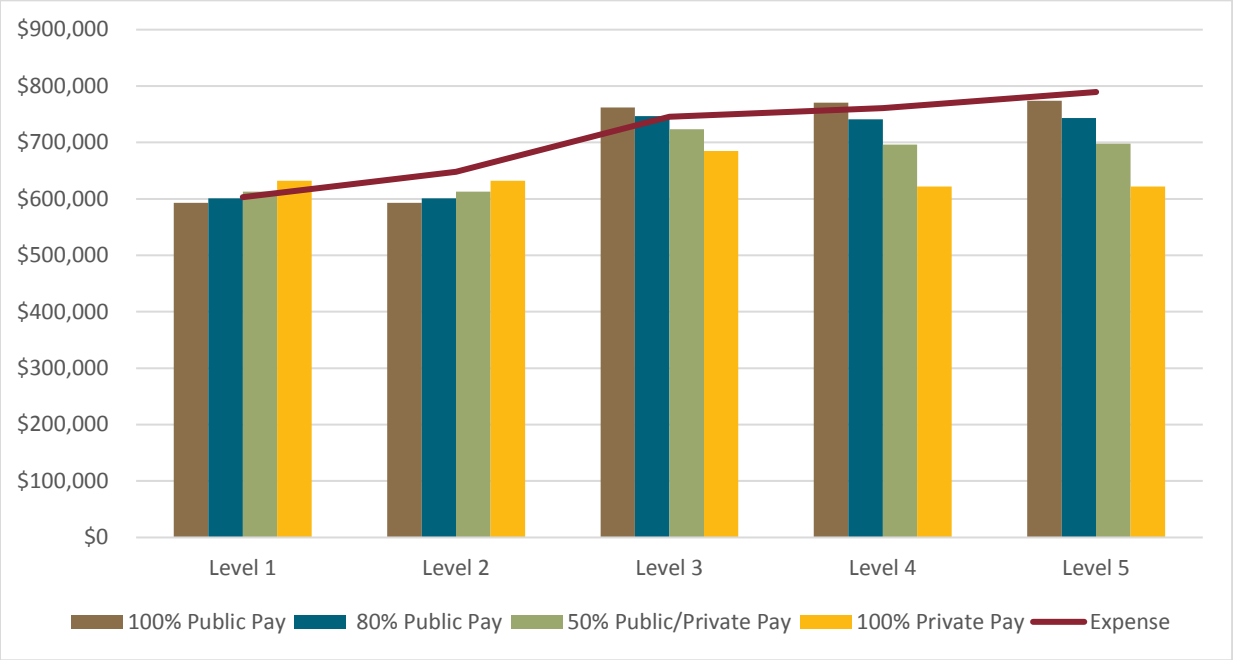
The effect of these very different market and subsidy rate combinations is extreme, as can be seen in the visual representation in Figure 9.

Figure 9. Net (loss)/revenue by regional cost of living



Public/private funding variations: While a specific county's subsidy structure has a strong influence on a provider's bottom line, the *mix* of privately and publicly funded children also affects a provider's net revenue. Often subsidy levels are lower than private pay market rates, meaning that providers who serve lower-income children are at a financial disadvantage, but the extent to which that is true can depend on the individual county's subsidy structure, prevailing market rates, and the ultimate combination of privately and publicly funded children. Figure 10 shows the base model county under four different public-private funding mixtures.

Figure 10. Impact of revenue sources on ability to meet expenses



In this scenario, most early care and education establishments can meet expenses at the lowest quality level, whether they are relying primarily on public or private sources of revenue. However, increasing quality to level 2 is problematic because revenues stay the same (they look lower in the graph because the expense line tricks the eye), while expenses for increased quality rise. Because this county has a strong tiered reimbursement structure for CCCAP payments, providers who serve low-income children as a large proportion of their enrollment (80–100%) can afford to reach for a higher level of quality and still meet expenses. However, as quality goes up and child class-sizes and ratios change accordingly, establishments with larger percentages of private pay enrollment cannot meet expenses without raising per-child rates for tuition-paying families or somehow cutting expenses.

When providers cannot meet expected expenses, they have limited choices for sustainability. To stay in business, we have to assume that providers in Colorado are being forced to either cut personnel or non-personnel expenses to match available revenue, or raise tuition beyond typical market rates. The former can impact quality and likely means that the workforce is earning salaries well below their qualifications, running risks for high turnover and unfairly putting the cost of quality on teachers and caregivers. The latter means that families are paying extremely high tuition and that many families who don't qualify for subsidies and can't pay additional tuition simply cannot afford higher quality care and education for their children.

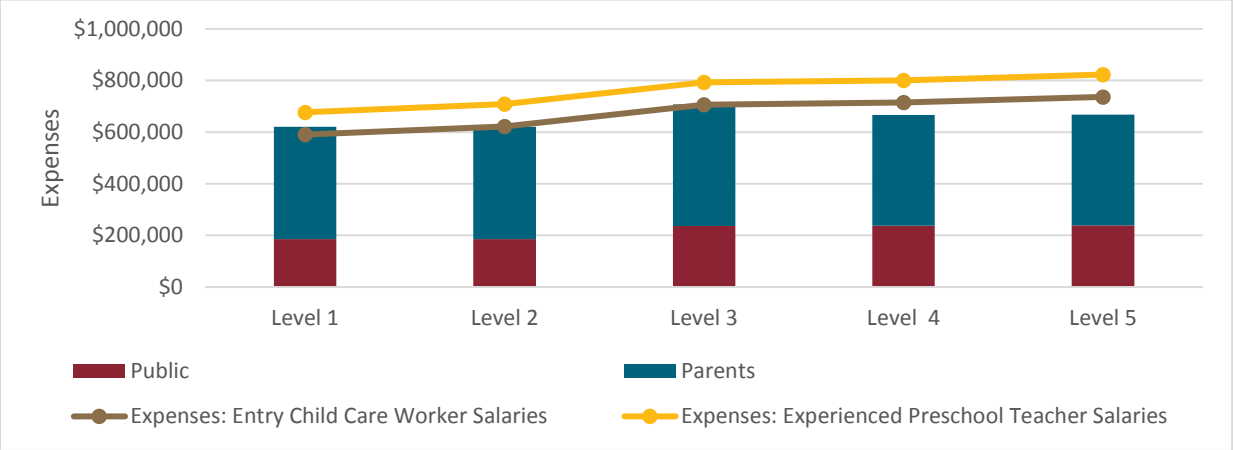
Salary variations: Because early care and education is a highly labor-intensive industry, salary variations can have a dramatic impact on providers' net revenues (and losses). Table 18 shows the impact of salary changes on net revenues, assuming lead teachers are being paid at entry, mean, and experienced salary levels for Childcare Workers and Preschool Teachers.

Table 18. Net revenues by salary and position classification

Quality Level	Entry	Mean	Experienced
Childcare Worker			
Level 1	$29,944	$3,970	−$9,020
Level 2	−$1,779	−$27,752	−$40,742
Level 3	$2,010	−$23,964	−$36,953
Level 4	−$48,343	−$74,316	−$87,306
Level 5	−$69,262	−$95,236	−$108,225
Preschool Teacher			
Level 1	$18,177	−$31,561	−$56,432
Level 2	−$13,546	−$63,283	−$88,154
Level 3	−$9,757	-$59,494	−$84,366
Level 4	−$60,110	−$109,847	−$134,718
Level 5	−$81,029	−$130,766	−$155,638

Early care and education establishments have strong incentives to keep wages low. Figure 11 shows the difference in a provider's ability to break even based on whether teacher salaries are set at an entry level for childcare workers versus the level typically earned by experienced preschool teachers. Even at the lowest salary levels, it is clearly difficult for providers to break even, and as expenses rise with quality, the margin between revenues and expenses widens substantially.

Figure 11. Impact of lead teacher salaries on provider expenses



Size variations: Table 19 holds region constant at a mid-range cost-of-living consistent with our base model, but varies the model for provider size. The size of an early care and education establishment plays an important role in its financial sustainability. Large providers (with 136–160 children and 9 classrooms) are much more able to break even or even make a profit at low- to mid-range quality levels. These larger providers frequently realize cost savings from having more 3- and 4-year-old classrooms with lower staffing ratios to offset the cost of infant and toddler classrooms. In fact, the annual per-child cost of care for a 4-year-old in a large center in

our base model scenario is $6,767, as compared with an annual per-child cost of $7,373 for that same child in a small center. Medium-sized providers (with 66–78 children and 5 classrooms) are also sustainable at the very lowest quality level. However, it is clearly difficult for smaller providers (with 36–44 children and three classrooms) and medium providers at higher quality levels to stay viable.

Table 19. Net revenues by size and quality level

Rating Level	Large	Medium	Small
Level 1	$130,184	$17,422	–$32,326
Level 2	$51,172	–$27,752	–$62,724
Level 3	$76,803	–$37,415	–$54,669
Level 4	–$9,638	–$94,494	–$67,580
Level 5	–$92,950	–$122,139	–$118,107

Infant/toddler variations: Because the ratio of infants/toddlers to teachers is lower than at older ages, serving infants and toddlers significantly increases the overall cost of providing care. It makes it that much more difficult for providers to be financially sustainable and explains why many simply choose not to serve children younger than 2 years old. Table 20 presents net revenues for providers who serve infants or toddlers versus those who do not. In our base case scenario (medium-sized provider in an average cost-of-living region), the only providers who are financially viable while serving infants are those that operate at the lowest level of quality. Early care and education establishments that choose not to serve this age group, however, are financially sustainable and even profitable through level 4.

Table 20. Net revenues by infant/toddler service and quality levels

Rating Level	Infants/Toddlers	No Infants/Toddlers
Level 1	$17,422	$72,840
Level 2	–$27,752	$34,113
Level 3	–$37,415	$67,221
Level 4	–$94,494	$684
Level 5	–$122,139	–$24,131

Bad Debt: The early care and education industry standard for bad debt, or unpaid tuition revenue, is 3% of tuition revenue.[103] Early care and education provider profitability is very sensitive to even small increases in bad debt. Table 21 shows mounting net losses that result from increasing levels of bad debt for a provider operating under our base model assumptions. As quality levels increase, the impacts of bad debt also increase and, like other impacts on net revenue, follow the pattern of subsidy reimbursement and market rates by quality level.

[103] National Center on Child Care Quality Improvement. (2014). *Early care and education program characteristics: Effects on expenses and revenues.* Washington, DC: Administration for Children and Families, Office of Child Care.

Table 21. Net revenue as a function of bad debt

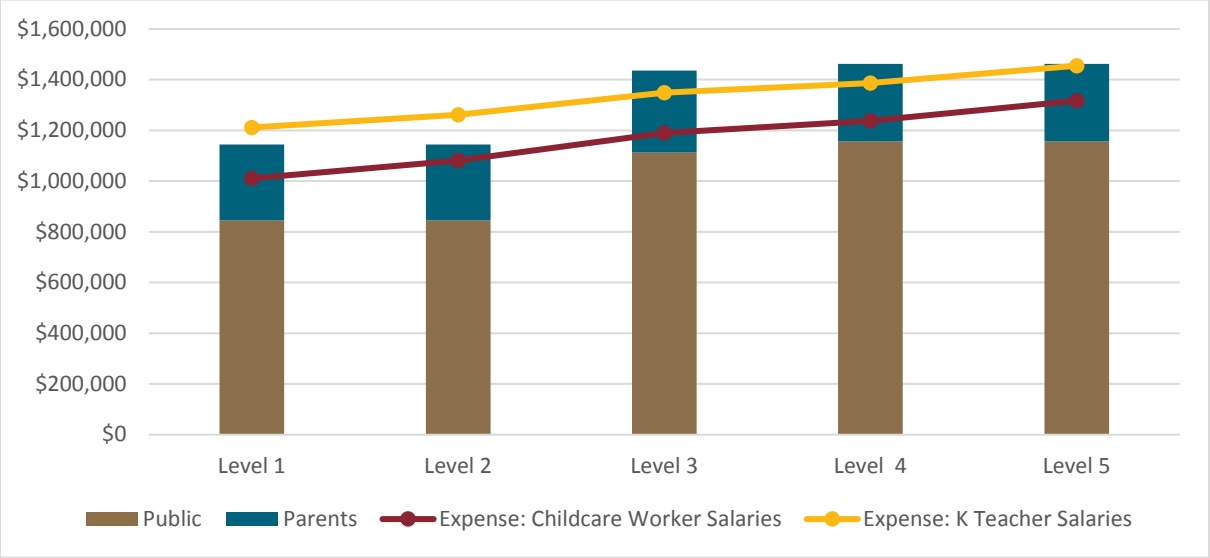
Rating Level	Profit/Loss 3% Bad Debt	Profit/Loss 5% Bad Debt	Profit/Loss 8% Bad Debt	Profit/Loss 10% Bad Debt
Level 1	$17,422	$5,344	–$12,773	–$24,851
Level 2	–$27,752	–$39,830	–$57,947	–$70,025
Level 3	–$37,415	–$51,299	–$72,124	–$86,007
Level 4	–$94,494	–$107,627	–$127,327	–$140,461
Level 5	–$122,139	–$135,292	–$155,023	–$168,176

Scenarios for Balancing Revenues and Expenses

A number of factors impact the revenue and expense balance, but the most significant ones are teacher salary levels, regional market rates, child care reimbursement structures, provider size, whether a provider serves infants and toddlers, turnover rates, and levels of bad debt (unpaid tuition).

Providers that can adjust for these factors can, theoretically at least, improve their sustainability and profitability. For instance, a *large* provider in our base scenario region of the state can meet or exceed expenses when they serve 75% of children through public reimbursement, do not serve infants and toddlers, and have exceptionally low turnover (10%). Providers that raise salaries to parity with kindergarten teachers can even meet expenses at high levels of quality, assuming tiered reimbursements are higher than market rates at high-quality levels, as they are in El Paso County (Figure 12).

Figure 12. Expenses/revenues under profit-maximizing operating scenario



However, providers face significant barriers to achieving all of these "ifs" in this ideal scenario. For instance, building a large early care and education business requires significant capital and

operating investments; further, some geographically expansive communities cannot fill a large, centralized center. Similarly, strong workforce incentives and healthy salaries are needed to minimize turnover, creating a chicken-and-egg scenario around the reduction in turnover rates. Additionally, the market already underserves infants and toddlers, with statewide licensed capacity to care for only 18% of children under 2 years old.[104] Likewise, there are not enough child care support dollars available to allow all businesses to serve a high proportion of children with subsidized care, and in some counties the reimbursement structure does not support strong tiered reimbursement structures that incentivize quality.

In short, reconfiguring specific cost drivers on a business-by-business basis is not likely to result in a functioning market scenario for the early care and education industry in Colorado. However, there are opportunities the state can pursue to reconfigure those aspects of the market that might be achievable, while also implementing additional innovative solutions. Some of these ideas are described in more detail in the next two chapters.

Takeaways: Cost of Early Care and Education

- Key industry cost drivers are wages, regional market rates and reimbursement structures, program size, and whether a provider offers infant/toddler care.
- Cost modeling finds that high-quality providers are less able to balance revenues and expenses than their low-quality peers.
- Child Care Assistance Program reimbursement rate structures can incentivize quality and boost provider viability.
- Early care and education professionals subsidize the industry in the form of low wages.

[104] Qualistar Colorado and Colorado Children's Campaign. (2014). *Child care affordability in Colorado: An investigation into child care costs and recommended strategies for improving affordability*. Denver, CO: The Women's Foundation of Colorado.

CHAPTER 3: How Low Wages and Turnover Impact the Early Care and Education Industry

Implications of Low Wages and Turnover

In this section, we explore ***how low wages and turnover impact the early care and education industry***. In particular, we examine the following questions:

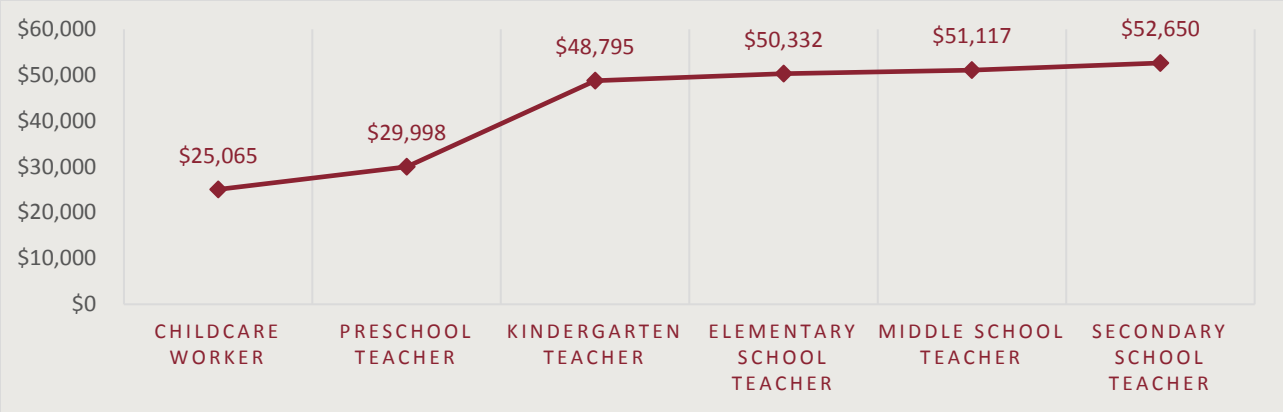
- How would higher wages impact provider costs?
- What public subsidies to the low-wage workforce are indirectly supporting the industry?
- What are the direct and indirect costs of teacher turnover?

Impact of Higher Wages on Provider Costs

Childcare workers earn less than many other comparable professions. In 2015, childcare workers earned only 51% of the average annual kindergarten teacher salary in Colorado, while preschool teachers earned only 61% as much as their kindergarten counterparts. Even preschool teachers in school-sponsored settings with bachelor's degrees earn only 80% of the compensation of comparably educated kindergarten teachers.[105]

Figure 13 shows the 2015 mean salaries for childcare workers and preschool teachers relative to teachers for children of other age groups.

Figure 13. Mean Colorado teacher salaries by child/student age (2015)[106]



[105] Whitebook, M., Phillips, D., & Howes, C. (2014). Worthy work, STILL unlivable wages: The early childhood workforce 25 years after the National Child Care Staffing Study. Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley.
[106] Colorado Department of Labor and Employment. (2017). Labor Market Information Gateway. Data represent mean annual salaries for Coloradans in 2015.

Research has increasingly demonstrated that educating and caring for young children is an essential role that requires mastery of multiple, complex skills.[107,108] Rising education, training, and quality expectations are also making the profession increasingly comparable to the education of older children, suggesting that early care and education professionals should be compensated similar to their K–12 peers.[109] This notion of c*omparable worth* is based on the idea that workers with similar qualifications and duties should receive similar compensation for the amount of time they work.[110]

Table 22 shows what net revenues would be for early care and education providers in Colorado if lead teacher wages were raised to parity with wages other caring and education professions earn. Estimates are for a small, medium, and large center, using our base model assumptions and a level 3 quality rating. The data show that raising lead teacher wages to parity with kindergarten teachers would cost a typical medium-sized center about $102,000 annually ($139,544 minus $37,415 – see highlighted table cells below). The data also show, though, that there may be room to raise wages closer to parity in some circumstances. For example, in the modeled scenario, wages for lead teachers in large centers might be raised to less than that of a kindergarten teacher, but above current levels for a preschool teacher.

Table 22. Net revenues when lead teachers earn wages equivalent to comparable professions

Lead Teacher Wage Equivalent	Entry Education[111]	Mean Annual Wage	Net Revenue (Small)	Net Revenue (Medium)	Net Revenue (Large)
Home health aides	None	$23,540	–$46,960	–$24,566	$99,931
Childcare workers	**HS Diploma**	**$25,065**	**–$54,669**	**–$37,415**	**$76,803**
Nursing assistants	HS diploma plus educational program	$25,815	–$54,795	–$37,625	$76,426
Preschool teachers	**Associate's Degree**	**$29,625**	**–$67,916**	**–$59,494**	**$37,061**
Kindergarten teachers	Bachelor's Degree	$43,571	–$115,946	–$139,544	–$107,029
Elementary school teachers	Bachelor's Degree	$45,213	–$121,601	–$148,969	–$123,994

[107] Shonkoff, J. & Phillips, D. (2000*). From neurons to neighborhoods: The science of early childhood development.* Washington, DC: National Academy of Sciences.
[108] Kagan, S. L., Moore, E., & Bredekamp, S. (Eds.). (2015). Reconsidering children's early development and learning: Toward common views and vocabulary. Washington, DC: National Education Goals Panel.
[109] Colorado Office of Early Childhood. (2015). *Colorado Shines program guide.* Denver, CO: Colorado Department of Human Services.
[110] Bellm, D., & Whitebook, M. (2004). *Compensation and comparable worth: What lies ahead for California's preschool teachers?* Berkeley, CA: Center for the Study of Childcare Employment.
[111] Bureau of Labor Statistics. *Occupational outlook handbook*. Retrieved on 3/8/17 from https://www.bls.gov/ooh/.

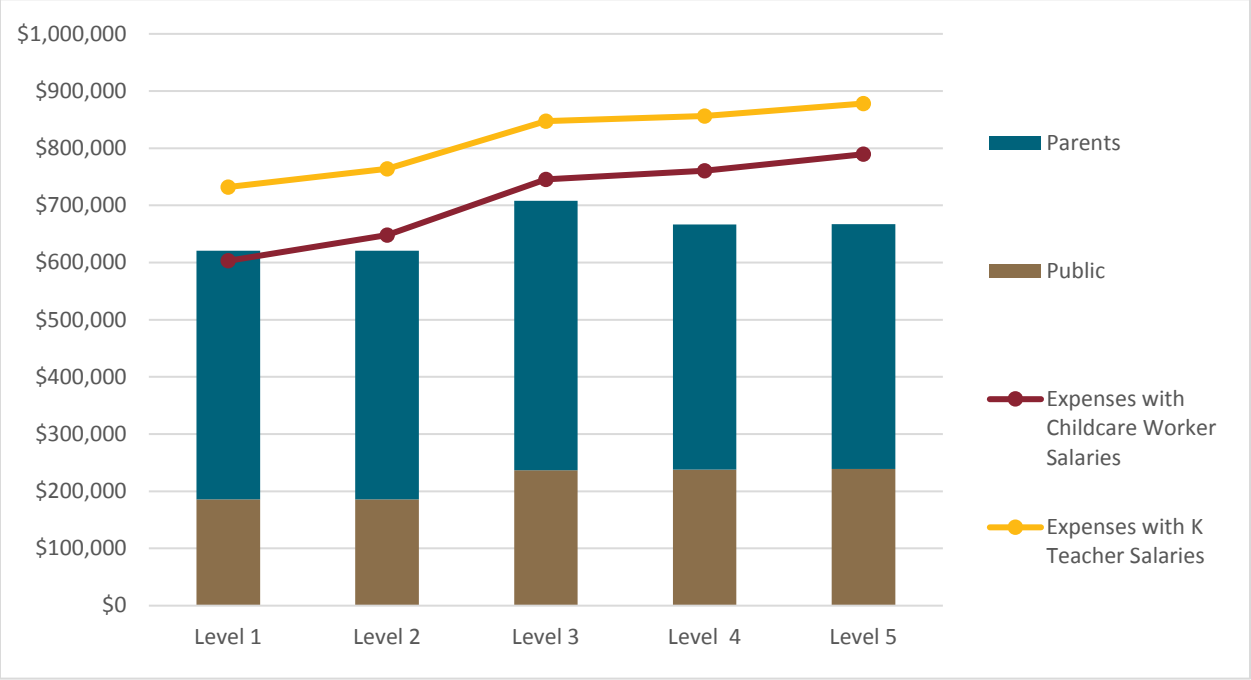
Lead Teacher Wage Equivalent	Entry Education[111]	Mean Annual Wage	Net Revenue (Small)	Net Revenue (Medium)	Net Revenue (Large)
Registered nurses	Bachelor's Degree	$65,988	–$193,150	–$268,218	–$338,642
Dental hygienists	Associate's Degree	$73,821	–$313,179	–$220,127	–$419,572

Source: Colorado Labor Market Information Gateway. Data represent average wages in 2015 for Colorado.

Clearly, higher wages for teaching staff in early care and education establishments will impact net revenue. Figure 14 shows how the gap between revenues and expenses widens when wages for lead teachers in early care and education are raised to parity with kindergarten teachers.

The current low wages are already exacting costs from the public and providers in various hidden forms that are not immediately evident. In particular, because childcare worker and preschool teacher wages are so low, many workers in this field are receiving public subsidies to supplement their low wages and make ends meet. Similarly, early care and education providers are already paying a cost for low wages in the form of high turnover rates that impact their profitability. We discuss each of these issues in turn, below.

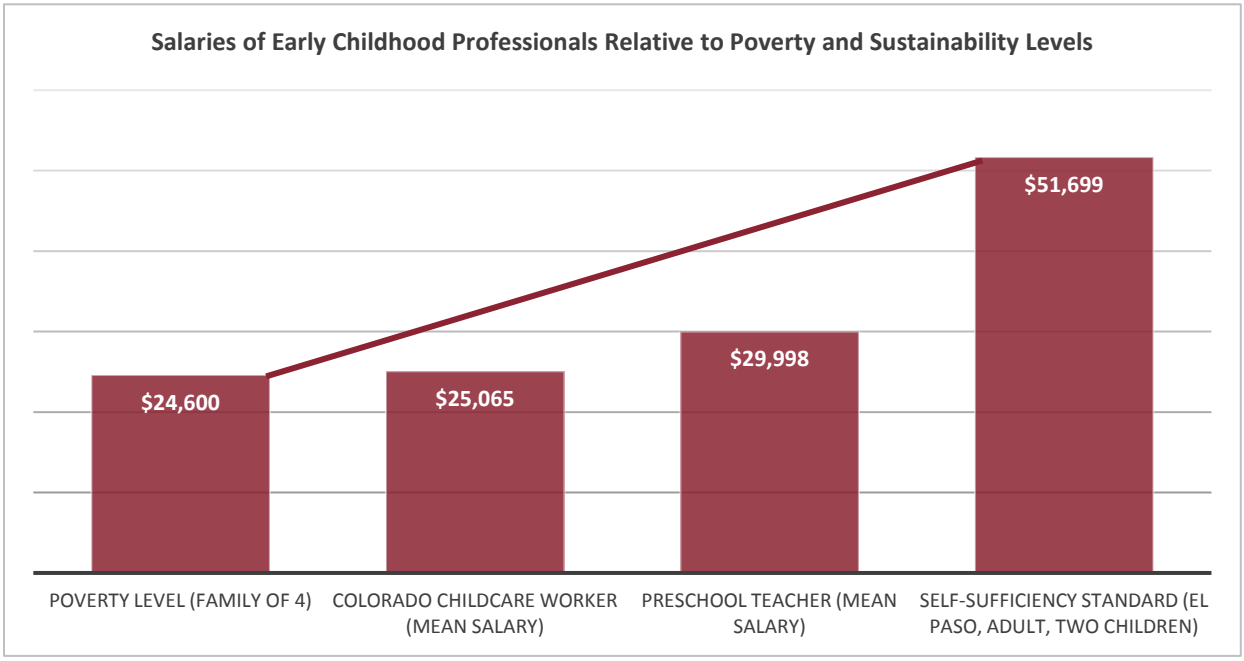
Figure 14. Cost of salary parity



Public Subsidies for Low-Wage Early Care and Education Workers

The typical childcare worker's wage in 2015 in Colorado was at the poverty level for a family of four. Similarly it was below the self-sufficiency standard for one adult, one preschooler, and a

school-age child, for even the lowest-cost counties in Colorado (the self-sufficiency standard ranged from $32,530–$74,213 across Colorado's counties in 2015).[112] This suggests that many childcare workers in the state likely qualify for public subsidy sources such as the Earned Income Tax Credit, Supplemental Nutrition Assistance Program (SNAP), Housing and Urban Development assistance, and Medicaid/Child Health Insurance Plans; the extent to which childcare workers in Colorado actually access these funding sources to make ends meet is not known.



A recent national randomized survey of 599 early childhood teaching staff found that 57% were somewhat to strongly worried about economic security; 35% of teaching staff reported accessing some form of public support in the last three years, with the most commonly accessed types of support being health and food subsidies.[113]

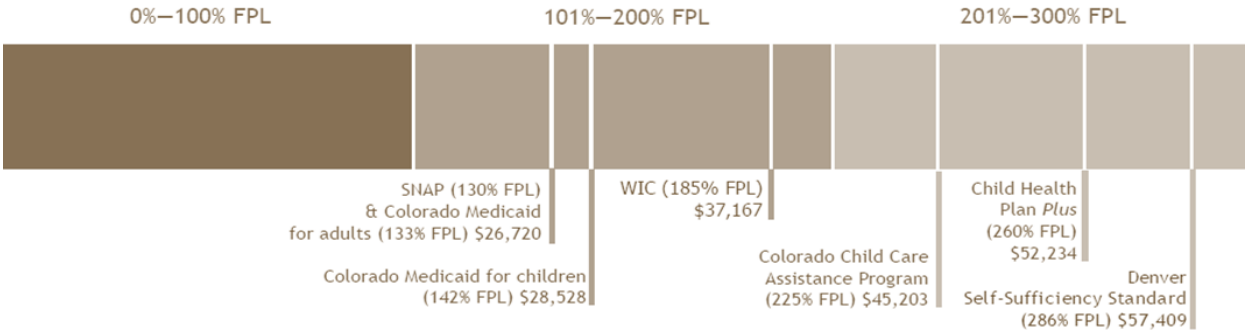
Public subsidies. In Colorado, access to public subsidies to support families whose incomes are too low to be self-sufficient can vary by county. The Colorado Child Care Assistance Program (CCCAP), in particular, allows counties to individually set eligibility for assistance, resulting in different eligibility standards from one county to the next that range from 165–230% of federal poverty levels.

Figure 15, created by Diana Pearce as part of her 2015 report on the self-sufficiency standard in Colorado, displays the public supports that a Denver adult with one school-age and one

[112] Pearce, D. (2015). *The self-sufficiency standard for Colorado 2015*. Denver, CO: The Colorado Center on Law and Policy.
[113] Whitebook, M., Phillips, D., & Howes, C. (2014). Worthy work, STILL unlivable wages: The early childhood workforce 25 years after the National Child Care Staffing Study. Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley.

preschool child would be eligible for at different wage levels. At an average annual salary of $25,732, a Denver childcare worker would qualify for SNAP, Medicaid for adults and children, WIC, CCCAP, and Child Health Plan Plus. Denver preschool teachers, with an average annual salary of $29,774, would qualify for all but the SNAP and Medicaid benefits, but might actually have a harder time meeting basic needs because of the lack of eligibility for those additional benefits.[114]

Figure 15. Eligibility levels for Colorado public subsidies: One adult, one school-age child, and one preschool child, Denver, 2015



Source: Pearce, D. (2015). The self-sufficiency standard for Colorado 2015. Denver, CO: The Colorado Center on Law and Policy.

Nationally, nearly one-half (46%) of childcare workers reside in families enrolled in one or more public support programs annually, compared to 25% of the US workforce as a whole. Medicaid and CHIP accounted for more than one-half of these costs (55%). Average program costs per enrolled family of US childcare workers are shown in the following table.[115]

[114] Pearce, D. (2015). *The self-sufficiency standard for Colorado 2015*. Denver, CO: The Colorado Center on Law and Policy.

[115] Whitebook, M., Phillips, D., & Howes, C. (2014). Worthy work, STILL unlivable wages: The early childhood workforce 25 years after the National Child Care Staffing Study. Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley. Analysis of childcare worker utilization of public subsidies co-authored by Allegretto, S., Graham-Squire, D., & Perry, I.

Table 23. Workforce support programs

Public Support Program	Average program costs per enrolled family (A)	Percentage of childcare workers with families enrolled (B)	Average program costs per childcare worker (A*B)
Federal Earned Income Tax Credit	$2,620	41%	$1,074
Medicaid (adults)	$7,500	15%	$1,125
Medicaid/CHIP (children)	$4,440	19%	$844
Supplemental Nutrition Assistance Program (SNAP)	$2,580	19%	$490
Temporary Assistance for Needy Families (TANF)	$3,110	2%	$62
TOTAL			**$3,595**

Assuming that these national numbers are comparable for Colorado, total subsidy costs for childcare workers would average **$3,595 annually**.[116] This number was calculated for each type of subsidy by multiplying the percentage of childcare workers' families receiving the subsidy by the average program costs per enrolled family. For example, the average subsidy for the Federal Earned Income Tax Credit, across all families, was $1,074 (41% enrolled x $2,620 per enrolled family).

Using this methodology, we estimate that the total public cost of individual subsidies to support the approximately 14,000 childcare workers in the state is therefore nearly **$20 million** per year. Since this number only reflects workforce subsidies for childcare workers and does not include a calculation for subsidies supporting the preschool teacher or teacher assistant/aide workforce, we anticipate that the actual cost of subsidizing early childhood professional wages in Colorado is considerably higher.

[116] This figure equals the average subsidy amount per childcare worker, multiplied by the percentage of workers receiving each type of subsidy,

Teacher Turnover

Cost of teacher turnover. Turnover is a significant factor in costs for small businesses. Maintaining business practices that reduce employee turnover can result in significant savings for employers. A report by the Center for American Progress (2012) reviewed thirty case studies from eleven research studies on the costs of turnover and concluded that among positions earning $30,000 or less, the typical cost of turnover is 16% of an employee's annual salary[117].

16%

Cost of turnover as a percent of annual salary for positions earning $30,000 or less annually

Center for American Progress (2012)

Several surveys have investigated turnover in the early care and education industry in particular. Estimates of turnover have ranged from approximately 15%–30%. A workshop report from the Institute of Medicine and the National Research Council identified a 29% turnover rate for childcare workers and a 15% turnover rate for preschool teachers.[118] Another study reports a 13% turnover rate across all centers.[119] Differences in turnover estimates can be attributed to study methodology and whether studies looked at turnover of all early care and education staff, or just specific positions, like lead teachers. What all of the experts agree on, however, is that low wages are a primary culprit of high turnover; one study found that nearly one-third (31%) of teaching staff who left Head Start

REASONS FOR TURNOVER OF EARLY CARE AND EDUCATION PROFESSIONALS:

Personal reasons, including low salary/benefits, low job status, and family illness and death

Classroom responsibilities, including managing student behavior, excessive stress, high demands/ responsibilities, poor working conditions, and emotional/physical exhaustion

Relationship issues, such as poor communication and social support and coworker disagreements

Source: Wells, M.B., (2015). Predicting preschool teacher retention and turnover in newly hired Head Start teachers across the first half of the school year. *Early Childhood Research Quarterly 30*, 152–159.

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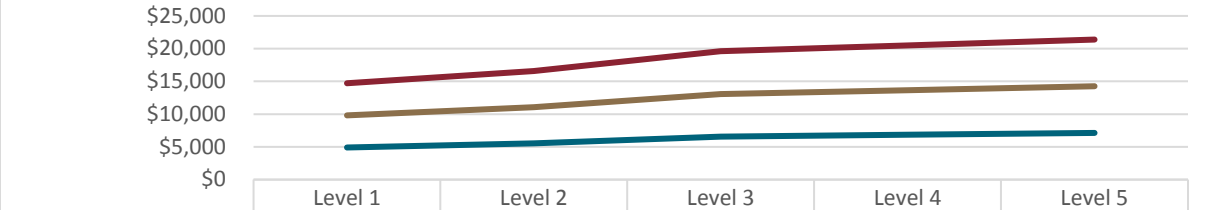
[117] Boushey, H., & Glynn, S. J. (2012). *There are significant business costs to retaining employees*. Washington, DC: Center for American Progress.
[118] IOM (Institute of Medicine) and NRC (National Research Council). 2012. The early childhood care and education workforce: Challenges and opportunities: A workshop report. Washington, DC: The National Academies Press.
[119] Whitebook, M., Phillips, D., & Howes, C. (2014). Worthy work, STILL unlivable wages: The early childhood workforce 25 years after the National Child Care Staffing Study. Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley.

programs in 2015–2016 did so because they were seeking higher compensation in the same field.[120, 121, 122]

Combining the estimate of 30% annual turnover with a cost of 16% of each departing employee's salary yields a total cost of turnover of 4.8% of all salary costs in the model. These numbers suggest that the total annual cost due to turnover alone is over $20,000 per year for a typical medium-sized provider in Colorado operating at a level 3 quality rating. Given the narrow profit margins under which providers operate, reducing turnover could make providers significantly more profitable.

Figure 16 shows the annual cost of turnover for our base model provider under a range of turnover rates and across quality levels. Reducing turnover from 30% to 20% would save the base model provider approximately $6,500 annually; reducing turnover another 10% saves an additional $6,500.

Figure 16. Annual cost of turnover, by quality level



	Level 1	Level 2	Level 3	Level 4	Level 5
Current (30%)	$14,719	$16,608	$19,623	$20,510	$21,392
Lower (20%)	$9,813	$11,072	$13,082	$13,673	$14,261
Lowest (10%)	$4,906	$5,536	$6,541	$6,837	$7,131

Takeaways: Impact of Low Wages and Turnover

- Childcare workers and preschool teachers in Colorado earn much less than kindergarten teachers.
- Because the wages of early care and education professionals are so low, many receive public subsidies to make ends meet. We estimate this costs the State of Colorado $20 million or more.
- Low wages contribute to worker turnover, which costs providers money—15%–30% of the annual salary for a position. Reducing turnover could make providers significantly more profitable.

[120] Whitebook, M., & McLean, C. (2017). Educator expectations, qualifications, and earnings: Shared challenges and divergent systems in ECE and K–12. Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley.
[121] Hale-Jinks, C., Knopf, H., & Kemple., K. (2006). *Tackling teacher turnover in childcare: Understanding causes and consequences, identifying solutions*. Childhood Education, Summer 2006.
[122] Whitebook, M., Phillips, D., & Howes, C. (2014). Worthy work, STILL unlivable wages: The early childhood workforce 25 years after the National Child Care Staffing Study. Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley.

CHAPTER 4: Free Market Expectations for a Public Good

Early Care and Education: Market-Based or Public Good?

It is clear from the data in Colorado and nationally that early care and education is not currently operating under a sustainable business model. It is difficult to look at the cost and revenue modeling results and not wonder how the industry itself is even surviving. This section examines this question by asking:

- Does the early care and education industry operate in a market-based way?

Public and Market Influences on the Early Care and Education Industry

In a market-based industry, prices and production are controlled by the supply of and demand for goods and services, rather than by government interventions.[123] As noted elsewhere in this report, the early care and education industry operates under a blended public and private funding system, is regulated by government entities, and is driven by both private and public motivations. In other words, it is not a pure market-based industry that is strictly controlled by supply and demand.[124]

> "Child care benefits society and the economy as a whole—but individual parents are not willing or able to pay for these **spillover effects***. As a result, **the market undervalues child care.**"
> **Enabling and quality investment effects*
>
> Johnson Harbach, M. J. (2015). Childcare market failure. *Utah L. Rev.*, 658–719.

At the same time, it is not fully a public good, either. Unlike other educational systems, such as K–12 education, parents pay the largest proportion of costs for early care and education, and they benefit directly as consumers of the industry's services.[125] This lack of clarity on the role of society and the public sector in supporting a quasi-market-based industry has led to a lack of action to address areas where the industry cannot operate in pure market fashion. According to one expert, "Our law and policy have yet to fully confront the changing nature of childcare or deliberately reevaluate what the state's role in the childcare market should be."[126]

In fact, early care and education is a failing market. ***Market failure*** occurs when actual market prices do not represent the true costs to provide a service, which is clearly the case in our modeling of Colorado's early care and education industry. In the case of early care and education, market failure occurs because the market produces too little *quality* early care and

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[123] Cambridge Dictionary. Retrieved 2/25/17. http://dictionary.cambridge.org/us/dictionary/english/market-based.
[124] Institute of Medicine and National Research Council. 2012. The early childhood care and education workforce: Challenges and opportunities: a workshop report. Washington, DC: The National Academies Press. doi:10.17226/13238.
[125] Stoney, L., Mitchell, A., Warner, M. E. (2006). Smarter reform: Moving beyond single-program solutions to an early care and education system. *Journal of the Community Development Society*. *37*(2), 101–116
[126] Harbach, M. J. (2015). Childcare Market Failure. *Utah Law Review*. *vol 3.*

education as compared to what would be best from a societal perspective.[127, 128] This happens when families make decisions about early care and education based on what they can afford to pay, even when the quality of that care may not lead to optimal societal benefits.

FACTORS THAT CAN CONTRIBUTE TO MARKET FAILURE IN THE EARLY CARE AND EDUCATION INDUSTRY

Positive externalities:	Child care benefits people other than those who pay for it (e.g., businesses, society)
Insufficient product differentiation:	Consumers are unable to distinguish quality care from non-quality care
Public regulations:	Needed requirements for such things as staff-child ratios and educational requirements increase child care quality, but depress child care supply

Sources:
Harbach, M. J. (2015). Childcare market failure. *Utah Law Review. vol 3.*
Hotz and Xiao (2011). The impact of regulations on the supply and quality of care in child care markets. *American Economic Review 101*(5):1775–1805.

In Colorado, as elsewhere in the United States, the market failure of the early care and education industry is clearly impacted by positive externalities. Most families are unable to pay the full cost of the quality care that they and society prefer, and society is not picking up the marginal costs between what families can afford and what quality services costs.

The current analysis suggests that the failure of the early care and education market in Colorado is a function of insufficient product differentiation. Modeling shows that some counties have established subsidy reimbursements that incentivize quality and promote sustainability, but for the most part, market rates do not effectively differentiate levels of quality. While, recent changes to the Quality Rating Improvement System (QRIS) in Colorado are intended to give providers and consumers more information than in the past about differences in quality across service options[129] the current analysis does not suggest that consumers are able to make decisions that support quality care based on this information.

[127] Blau, D. (2001). *The child care problem: An economic analysis.* New York, NY: Russell Sage Foundation.
[128] Harbach, M. J. (2015). Childcare market failure. *Utah Law Review., vol 3.*
[129] Colorado Office of Early Childhood. (2015). *Colorado Shines program guide.* Denver, CO: Colorado Department of Human Services.

Finally, recent research shows that regulations requiring such things as high staff-child ratios at various quality levels and increased professional education and training have the effect of increasing quality and possibly price competition. However, these regulations may also reduce the overall number of early care and education centers.[130] The current research cannot identify the extent to which this is the case in Colorado, but assuming these trends are an accurate reflection of the Colorado early care and education industry, it is reasonable to expect that regulations may also impact the extent to which the industry can and should operate as a pure market.

Takeaways: Early Care and Education Market

- The early care and education industry operates under a blended public/private system. It is not a pure market-drive industry that is strictly controlled by supply and demand.
- The market undervalues early care and education because parents are not willing/able to pay for its societal benefits and contributions to the economy as a whole.
- As a result, early care and education is a failing market, where market prices do not represent true costs.

CHAPTER 5: Innovative Solutions

Recommendations

The current research has demonstrated that Colorado's early care and education industry makes significant contributions to the state's economy in the form of immediate, enabling, and investment effects. In particular, the industry not only contributes to the industry itself, but it creates revenue, income, and jobs across other state industries. In addition, it has the added effects of enabling parents to participate in the workforce and generating long-term economic and societal gains from improved development and outcomes for children served over their lifetimes.

This study has also shown that the impact of the early care and education industry is similar to that of other comparable sectors, such as K–12 and higher education and home health care. Additionally, the industry is expected to grow over the next ten to twenty years and will need to be sustainable over that time.

The industry itself is difficult to sustain, however. Current funding mechanisms result in a public/private funding split of 28/72%, which reflects a lower public investment than the average 38% nationally.[131] In fact, the cost of providing quality early care and education involves many complex factors, including the geographic region where a provider is located, provider size, quality level, salaries, and whether the provider serves infants. The cost of quality is also impacted by rates of bad debt and teacher turnover, both of which can severely impact provider sustainability.

> "What are the public costs of continuing an approach to ECE that burdens young parents with high fees and generates jobs for teaching staff that fuel poverty?"
>
> *Whitebook, Phillips, & Howe (2014)*

Low wages and high turnover rates are problematic for providers who are trying to offer quality services while maintaining a reasonable profit margin. The current analysis estimates that many industry workers are eligible for workforce subsidies such as Temporary Assistance for Needy Families, Medicaid and CHIP, and food subsidies such as SNAP and WIC. Even with these supports, which we estimate to cost more than $20 million annually, wages for Colorado's childcare workers are frequently not enough for families to be self-sufficient. At the same time,

[131] RegionTrack, Inc. (2015). *Child care in state economies.* Oklahoma City, OK: Committee for Economic Development; Alliance for Early Success.

providers themselves do not bring in adequate revenues to meet the costs of providing quality care.

The early care and education industry is in market failure. Market prices do not represent the true cost of care, and, as a result, the industry cannot and does not produce the quality of care that society expects.

To solve these deep problems, we make several recommendations:

Increase funding for child care and education subsidies. The Colorado Department of Human Services (CDHS) has estimated that only 13% of the CCCAP-eligible children in Colorado currently receive the subsidy at some level throughout a year.[132] Similarly, the Colorado Department of Education has reported that more than 11,000 at-risk 4-year olds have no access to preschool through either the Colorado Preschool Program or Head Start.[133] This data suggests a significant unmet need for child care and education funding assistance that could not only help more children and families access quality care and put more parents in the workforce, but could improve the solvency of providers that are struggling to meet expenses and their ability to offer teachers a living wage. State lawmakers should explore opportunities for either accessing more federal funding and/or creating new state child care and education funding streams.

Improve tiered reimbursement structures. Our modeling demonstrates that counties with tiered reimbursement strategies that effectively incentivize quality and the care of infants and toddlers can promote provider sustainability. In addition, those counties that reimburse quality programs at or above market rates are better able to counteract the market failure of the industry. In Colorado, the state and counties should work together to encourage each county to set reimbursements rates that will encourage the provision of infant/toddler care and maximize high-quality early care and education for all children.

Create institutional subsidies. In addition to existing early care and education subsidies, which provide financial assistance to families, new funding mechanisms are needed that provide direct institutional support to providers.[134] Institutional subsidies have been used to support other industries we value as a society, such as solar energy and farming, where the public sector steps in to pay the marginal cost of a public good. A similar mechanism for the early care and education industry could be made available to providers as direct institutional subsidies that are tiered to reflect quality levels and the care of infants and toddlers. That is, higher quality providers, and especially those who provide care to underserved age groups, should be

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[132] Hardin, J. & Fulton, B. (2017). *Colorado Child Care Assistance Program stakeholder convening series final report*. Denver, CO: Civic Canopy.
[133] Colorado Department of Education. (2016). *Colorado Preschool Program Amended Legislative Report*. Denver, CO.

[134] Stoney, L., Mitchell, A., & Warner, M. E. (2006). *Smarter reform: Moving beyond single-program solutions to an early care and education system*. *Journal of the Community Development Society, 37*(2), 101–116.

incentivized with higher subsidies; all industry subsidies should be established to go toward increasing the wages of childcare workers and preschool teachers to parity with their peers in kindergarten and elementary school settings. By doing this, the public sector can provide the industry with the financial capital to make changes that will benefit children, families, the early care and education workforce, and our society at large.

Institute tax credits for early care and education professionals. This study highlighted the wage disparity for early care and education professionals as compared with their K-12 peers. This disparity is a leading cause for high turnover in the industry, which negatively impacts the quality of early care and education available to children and families. At a time when the state has greatly increased professional development and educational expectations for early care and education professionals, it is more important than ever to recognize increased skill development with appropriate wage increases. While not a substitute for higher wages, one option for improving workforce retention, reducing turnover, and compensating professionals for their increased educational attainment is to institute professional tax credits that award refundable, graduated tax credits to early childhood educators with increasingly higher levels of education and credentials.[135]

Takeaways: Innovative Solutions

The early care and education industry makes a substantial impact on Colorado's economy, but the market has serious problems, such as low public funding, high worker turnover, and market prices that do not reflect the true cost of care. To address these issues, we recommend the following:

- Increase public funding for early care and education in Colorado—at least to the national average.
- Improve counties' tiered reimbursement structures to further incentivize quality and the provision of care for infants and toddlers
- Establish subsidies for early care and education businesses to increase the wages of early care and education workers.
- Offer refundable tax credits for early learning professionals, with graduated amounts to incentivize higher levels of education and credentials.

[135] Ullrich, R., Hamm, K., & Schochet, L. (2016). *Six policies to support the early childhood workforce*. Washington, DC: Center for American Progress.

Appendix A: Assumptions List for Cost Model

Wage Data

Wage data are based on Colorado state averages for the job titles drawn from the occupational categories that most closely matches the job descriptions reflected in the cost model. Wages increase as the program moves up QRIS levels, expressed as an increasing percentage of the BLS wage data, based on logical assumption that as programs increase quality, wages for staff increase as well.

The baseline model assumes the following salaries and multipliers by quality level:

Staff Description	BLS Job Title	Salary (Denver)	Salary (El Paso)	Salary (Mesa)	BLS Salary Multipliers				
					Level 1	Level 2	Level 3	Level 4	Level 5
Director	Child care/preschool administrator	$47,493	$48,947	$48,220	90%	100%	110%	115%	120%
Office manager	Office & administrative support workers	$34,377	$32,786	$32,351	90%	100%	110%	115%	120%
Ed. coordinator	Instructional coordinator	$68,621	$78,312	$55,146	55%	60%	70%	72%	75%
Health care consultant	Registered nurse	$71,727	$65,988	$68,049	90%	90%	100%	100%	100%
Lead teacher	Childcare worker	$25,732	$23,435	$21,077	90%	100%	110%	115%	120%
Teacher assistant	Childcare worker	$25,732	$23,435	$21,077	85%	95%	105%	110%	115%
Teacher aides	Minimum wage @2,080 hour per year	$19,344	$19,344	$19,344	100%	105%	110%	110%	110%

Non-Personnel Costs

Costs for non-personnel items, such as food, education equipment, and insurance, are adjusted by the Cost of Living Index (COLI) for the selected region. Baseline values are as follows:

Per Child Costs

Food & Food Prep	$1,000
Kitchen Supplies	$50
Education Supplies	$50
Education Equipment	$100
Office Supplies	$30
Office Equipment	$22
Insurance (liability, accident, etc.)	$75
Payroll Service	$30

Credit/Debit Card Processing Fees	$20
Advertising	$25
Postage	$24
Miscellaneous	$15
Consultants/Training	$50
Transportation	$50

Other Annual Costs

Telephone and Internet	$1,440
Audit	$3,000
Fees/Permits	$550

Number of Staff

The staff-child ratios and maximum group sizes are based on Colorado licensing requirements for QRIS levels 1, 2, and 3 and at NAEYC ratios for QRIS levels 4 and 5. Group sizes are as follows:

Age	QRIS Levels 1–3	QRIS Levels 4–5
0–24 mo.	10	8
12–24 mo.	10	8
24–36 mo.	14	12
3-year-olds.	20	18
4-year-olds	24	20

Provider Sizes

The number of classrooms for each provider size are as follows:

	Large	Medium	Small	Large	Medium	Small
0–24 mo.	1	1	1	0	0	0
12–24 mo.	1	1	1	0	0	0
24–36 mo.	2	1	0	2	1	1
3-year-olds	2	1	0	3	1	0
4-year-olds	3	1	1	3	2	1
Total	**9**	**5**	**3**	**8**	**4**	**2**

Tuition Rates

Subsidy rates are based on 2016–2017 CCCAP reimbursement rates for example counties with high, average, and low COLI. The baseline model assumes that 30% of children receive subsidy.

The alternate models for private pay-only and high-needs providers assume that 0% and 85% of children receive subsidy, respectively.

Market prices, used to set privately paid rates in the model, come from the 2015 Market Rate Survey for each county. In order to adjust the market rate survey to QRIS levels in the cost model, market rates were applied as follows:

QRIS Level	Market Rate Percentile
Level 1	40th percentile
Level 2	40th percentile
Level 3	50th percentile
Level 4	60th percentile
Level 5	60th percentile

Other Assumptions

Efficiency. Enrollment is assumed to equal 85% of licensed capacity, which is the industry standard.

Bad debt. The baseline model assumes the industry standard of bad debt as 3% of revenue. The alternative high bad debt scenario assumes 10% bad debt.

Percentage of daily coverage. The model assumes that an early care and education center is typically open for 10 hours a day and staff work an 8-hour day, that staff must be given breaks during the day, and that some percentage of staff time will need to be spent outside of the classroom for other miscellaneous duties.

Base substitute time for staff training. Staff training hours are based on minimum State Regulations (15hrs/year), and assume that staff training increases with improved QRIS levels.

Sub time for staff leave. Based on assumed staff leave time per year, increasing with each QRIS level.

Attendance. 250 days of operation is typical based on national research.

Non-personnel costs. Baseline costs are based on national averages defined and detailed in the Provider Cost of Quality Calculator (PCQC): www.ecequalitycalculator.com.

Mandatory benefits. Based on federal and Colorado requirements.

Health insurance. We assumed that at QRIS levels 3–5, some health care benefits are given to staff. The model currently uses health care statistics from Clayton Early Learning.

USDA Child and Adult Care Food Program (CACFP). The model assumes that all programs participate in CACFP, since it is an open-ended, federally funded entitlement program.

Appendix B: Calculation of Economic Multipliers

The economic multipliers presented in Chapter 1 derive from Regional Input-Output Modeling System (RIMS-II) multipliers calculated by IMPLAN, an economic analysis corporation. RIMS-II multipliers estimate the relationship between one component of an economic sector and the impact of that component on another component or sector. For example, RIMS-II multipliers can be used to estimate the number of jobs which are created in the economy at large due to a single job created in a specific industry (such as child care).

RIMS-II multipliers can be used to model economic effects of the child care industry using any of three metrics: 1) revenues 2) employee earnings, and 3) employment (number of jobs). For each of these metrics, multipliers can be calculated for the following effects:

- The **direct effect** refers to the amount of economic activity within the child care industry. This can be expressed as annual revenues; employee earnings; or jobs (22,501).
- The **indirect effect** refers to economic activity triggered as a result of purchases made by the child care industry (such as classroom materials or rent). This effect is calculated using a Type I multiplier. The indirect effect is equal to [(Type I multiplier x Direct effect) - Direct Effect].
- The **induced effect** refers to economic activity trigged in other sectors as a result of household spending from owner and employee earnings. For example, this could include child care staff purchasing groceries or paying mortgages. The induced effect is calculated using a Type II multiplier. The induced effect is equal to [(Type II multiplier x Direct effect) – (Direct effect + Indirect effect).

The table below presents calculations for each type of economic activity, for each effect.

	Revenue (m)	Earnings (m)	Jobs
Type I Multiplier	*1.46*	*1.25*	*1.15*
Type II Multiplier	*2.25*	*1.75*	*1.45*
Direct Effect	$639.7	$353.7	22,501
Indirect Effect	$295.5	$87.3	3,375
Induced Effect	$504.1	$178.0	6,750
Immediate Economic Benefit	**$1,439.3**	**$619.0**	**32,626**

Indirect Effect = (Type I Multiplier * Direct Effect) – Direct Effect.

Induced Effect = (Type II Multiplier * Direct Effect) – (Direct Effect + Indirect Effect).

Total Immediate Effect = Direct Effect * Type II Multiplier