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December 2021

Early Achievers Evaluation Report Three:

Variation in Links between Quality and Kindergarten Readiness for Children with Childcare Subsidy

The 2015 Washington State Legislature passed the Early Start Act, which required all early care and education programs serving non-school-age children and receiving state funds to participate in the state's quality rating and improvement system, Early Achievers.

The legislature also directed the Washington State Institute for Public Policy (WSIPP) to evaluate the relationship between Early Achievers quality ratings and outcomes for children in subsidized child care and early education.[1] In our 2020 report, we presented evidence that, on average, attending high-quality pre-k is positively related to kindergarten readiness.[2]

In this report, we examine how both children's history of care prior to the pre-k year and the neighborhood characteristics of child care sites influence the relationship between quality pre-k and kindergarten readiness. Coaching is thought to promote higher quality care; therefore, we also explore the receipt of coaching services leading up to sites' initial ratings.

Summary

The 2015 Washington State Legislature passed the Early Start Act (ESA), requiring all child care and early learning programs receiving state funds to participate in Early Achievers, the state's quality rating and improvement system (QRIS).

The ESA directed the Washington State Institute for Public Policy to evaluate impacts of Early Achievers (EA) ratings on child outcomes, and to produce a benefit-cost analysis, in a series of four reports.

In this third report, using the sample of children with child care subsidy, we explore whether the duration of children's enrollment or the accumulation of site community risk factors alters the established positive link between attending a pre-k site that meets EA quality standards (i.e., "at quality") and kindergarten readiness in the following year.

Our findings indicate that the positive relationship between "at quality" pre-k on later kindergarten readiness, for children with child care subsidy, is driven by children with two or more years of enrollment in "at quality" care..

Additionally, we observe stronger impacts for attending an "at quality" site for children in sites with higher levels of community vulnerability, suggesting that quality care may be effective in addressing the kindergarten readiness gap associated with neighborhood disadvantage.

Overall, this analysis helps to better inform for whom, and under what context, EA is most effective.

[1] Second Engrossed Second Substitute House Bill 1491, Chapter 7, Laws of 2015.

[2] Goodvin, R., Rashid, A., & He, L. (2020). *Early Achievers evaluation report two: Pre-Kindergarten quality and child outcomes in kindergarten* (Doc. No. 20-12-2203). Olympia: Washington State Institute for Public Policy.

In Section I, we review WSIPP's assignment to evaluate the Early Achievers Quality Rating and Improvement System (QRIS). We provide an overview of our planned report series and outline the research questions addressed in this report. In Section II, we briefly review the implementation of Early Achievers and summarize background evidence that informs our research questions. In Section III, we review data sources and key variables, and in Section IV, we describe the site and child samples used in this evaluation. In Section V, we summarize our overall research approach and the results corresponding to each research question. In Sections VI and VII, we outline the limitations of the evaluation followed by a summary and discussion.

Legislative Assignment

The Washington state institute for public policy shall conduct a longitudinal analysis examining relationships between the early achievers program quality ratings levels and outcomes for children participating in subsidized early care and education programs. (b) The institute shall submit the first report to the appropriate committees of the legislature and the early learning advisory council by December 31, 2019. The institute shall submit subsequent reports annually to the appropriate committees of the legislature and the early learning advisory council by December 31st, with the final report due December 31, 2022. The final report shall include a cost-benefit analysis.

2E2SHB 1491, Early Start Act of 2015

I. Introduction

The Early Start Act (ESA) of 2015 directed WSIPP to produce an evaluation of Early Achievers that addresses the relationship of quality ratings to child outcomes over time. The assignment specifies that WSIPP should assess outcomes for "children participating in subsidized early care and education programs." See Exhibits 1 and 2 of WSIPP's Early Achievers Report One for a more detailed summary of subsidized child care and early learning (CC/EL) programs encompassed under this direction.[3] Finally, the assignment directs WSIPP to include a benefit-cost analysis in the final report.

Early Achievers Evaluation Report Series

The ESA directed WSIPP to produce a series of four reports on the Early Achievers evaluation. See Exhibit 1 for an overview. The present report is the third in the series. Plans for the final Early Achievers report, to be released in 2022, will be adjusted to accommodate the impacts of COVID-19-related closures on Early Achievers, child care and early learning programs, and K-3 schooling and assessments.[4]

Research Questions

In this report, we further examine the relationship between quality of care in the pre-k year and outcomes in kindergarten. Specifically, we address the following two questions regarding the potential impact of child- and site-level differences in overall impacts:

1) Does the positive relationship between attending a site that meets quality standards and kindergarten readiness differ depending on the duration of exposure to quality child care prior to the pre-k year?
2) Does the positive relationship between attending a site that meets quality standards in the pre-k year and kindergarten readiness vary depending on the neighborhood characteristics of the site?

[3] Goodvin, R., & Hansen, J. (2019). *Early Achievers evaluation report one: Background and research design* (Doc. No. 19-12-2202). Olympia: Washington State Institute for Public Policy.

[4] WSIPP's initial plan for the evaluation and benefit-cost analysis due in December 2022 was to focus on the relationship of pre-k year Early Achievers to outcomes through the 3rd grade to inform a benefit-cost analysis (BCA). COVID-related closures limit the cohorts for whom 3rd grade outcomes are available and as a result WSIPP is revising plans for the final report. We anticipate that a BCA will still be possible using WaKIDS as the outcome of interest.

Additionally, we present a descriptive analysis of childcare coaching receipt. Coaching includes a range of initiatives intended to improve site quality in advance of receiving a rating.[5] We also examine the relationship between coaching and child care site EA ratings.

In this report, we focus exclusively on child care sites that do not provide the Early Childhood Education and Assistance Program (ECEAP) and children attending non-ECEAP sites with child care subsidy. This focus is largely due to data availability and constraints in data for ECEAP providers, to be described in further detail in Section V.[6] The final report in the Early Achievers series, due in 2022, will include both ECEAP and child care subsidy samples.

Each research question, along with the corresponding research design, is described in greater detail in Section V of this report.

Exhibit 1

Early Achievers Evaluation Report Series Plan

Report one: Dec 2019	Report two: Dec 2020	Report three: Dec 2021	Report four: Dec 2022
Background and research design	**Pre-k year relationship with kindergarten outcomes**	**Special topics**	**Benefit-cost analysis; Availability of high-quality care**
Describe Early Achievers implementation, review national evidence on QRIS in relation to child outcomes, summarize ratings progress to date, and outline planned research design and evaluation limitations.	Evaluate the relationship between Early Achievers participation, and rating level, in the year prior to attending kindergarten (pre-k year) and child outcomes in kindergarten.	***Examine how program impacts differ by the following:*** • ***child history of care and*** • ***site neighborhood vulnerability*** ***Explore coaching receipt.***	Benefit-cost analysis of the impact of Early Achievers in the pre-k year on child outcomes in kindergarten. Geospatial analysis of the availability of high-quality care.

[5] Coaching services for non-ECEAP childcare providers are delivered through Child Care Aware of Washington regional offices.

[6] WSIPP will release a separate report more fully addressing effects of ECEAP dosage on child outcomes in January 2022, as directed in Engrossed Second Substitute House Bill 1391, Chapter 369, Laws of 2019. Analyses regarding effects of duration, as well as those examining the role of neighborhood characteristics, are not feasible here due to limited underlying variation in Early Achievers (EA) quality ratings for ECEAP. Systematic records for provision of coaching services prior to initial ratings are only available for non-ECEAP child care providers.

II. Background

QRIS and Early Achievers Implementation

Quality rating and improvement systems for early childhood education (ECE) are a framework for supporting workforce development and enriching care quality and ultimately for improving children's care experiences. QRIS have emerged as a strategy for expanding access to high-quality care, with most states enacting a QRIS over the past two decades.[7]

Washington's QRIS, Early Achievers (EA), initially rolled out from July 2012 through July 2013 as a voluntary program. Passage of the ESA in July 2015 made EA mandatory for sites serving non-school-age children with state funding and optional for all other licensed or certified CC/EL providers.

The ESA sets timelines and other expectations for participation.[8] Sites serving children with public funding were required to meet a specified level of quality with respect to EA standard areas.[9]

Early Achievers Overview

When sites register for Early Achievers, they may access rating readiness supports that include coaching and consultation to enrich care quality. Additionally, some sites may receive need-based grants or professional development scholarships.

Sites receive a rating from Level 2 to Level 5 based on points earned across the five EA quality standard areas.[10] Exhibit 2 illustrates rating levels and corresponding points.

Exhibit 2

Overview of Early Achievers Points by Level

Note:
Source: Adapted from Early Achievers Participant Operating Guidelines, January 2020.

[7] According to the Build Initiative's Quality Compendium, 41 states and the District of Columbia were implementing a QRIS as of Fall 2019.

[8] See EA report one for a timeline summarizing EA implementation, milestone dates, and key policy changes from (2012-2019). WSIPP's evaluation will cover EA as it was implemented through 2019. WSIPP's data and analysis will not reflect changes to EA enacted in 2019-2021.

[9] E2SHB 1391. Additionally, DCYF's Early Achievers Operating Guidelines comprehensively describe the system. DCYF. (2020). *Early Achievers Participant Operating Guidelines.* Olympia: Washington.

[10] Overall EA quality ratings are most strongly tied to the learning environment and interactions standard area. More detail about the standard areas, which include environment and interactions, curriculum, staff support and training, and child and family partnerships, is included in the Appendix I.

Child Care Quality and Child Outcomes: Moderators of Overall Impacts

WSIPP's second report in the Early Achievers series provided an overall assessment of the links between site quality ratings and children's kindergarten readiness.[11] On average, children attending a site in their pre-k year that met EA quality standards had higher rates of kindergarten readiness compared with children in sites that did not yet meet standards.

In particular, we found that, *on average, children in child care subsidy sites rated at a level three or higher (i.e., "at quality") were about 10% more likely to be kindergarten ready compared with similar children attending sites rated at a level two (i.e., "not at quality").*

In this report, we will investigate how the impact of attending a pre-k site that meets EA quality standards may vary across two select child and site characteristics. This analysis will better inform for whom, and in what contexts, EA is most effective.

Quality Child Care Duration

In report two, we focused on quality care during children's final pre-k year because it is closest in time to kindergarten, and therefore the most immediately relevant to kindergarten readiness. However, children enter the final pre-k year with varying histories of earlier child care enrollments and quality of care. Questions, therefore, remain regarding whether the duration of time in quality care affects the strength or direction of the relationship between enrollment in high-quality care and kindergarten readiness.

Existing research suggests that the duration of exposure to high-quality care is related to child development. Multiple studies comparing enrollment for one versus two years in high-quality pre-k indicate that two years has a larger positive impact than a single year on outcomes such as literacy, language, and cognitive development, as well as lower rates of grade retention and special education placement.[12]

In this study, we test whether the relationship between EA quality ratings and kindergarten readiness differs depending on children's duration of care in sites rated at or above quality. *A better understanding of how the benefits of high-quality care depend on quality care tenure has relevance to policy and program decisions about supporting child care enrollments.*

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[11] Goodvin et al. (2020).

[12] Blanden, J., Del Bono, E., Hansen, K., & Rabe, B. (2021). Quantity and quality of child care and children's educational outcomes. *Journal of Population Economics,* 1-44; Shah, H., Domitrovich, C., Morgan, N., Moor, J., Cooper, B., Jacobson, L., & Greenberg, M. (2017). One or two years of participation: Is dosage of an enhanced publicly funded preschool program associated with the academic and executive function skills of low-income children in early elementary school? *Early Child Research Quarterly, 40*, 123–137; and Xue, Y., Miller, E.B., Auger, A., Pan, Y., Burchinal, M., Tien, H. . . . (2016). IV. testing for dosage-outcome associations in early care and education. *Monographs of the Society for Research in Child Development 81*(2), 64–74.

Site Neighborhood Characteristics

In report two, we examined the overall associations between care quality and child outcomes, without respect to community context. In this report, we investigate if and how this association differs across community characteristics. This is an important consideration given that a broader program goal of Early Achievers is to improve care quality for children in communities furthest from educational opportunity.[13]

In general, the presence of higher levels of community risk (such as high poverty, high unemployment rates, and lack of access to transportation) has been associated with lower rates of kindergarten readiness, both in Washington and elsewhere.[14]

While the role of communities in children's development is complex,[15] a high-level examination of community risk factors in our analyses can help us understand whether the impacts of attending a site meeting EA quality standards are consistent across communities. At a minimum, we should identify whether the overall benefit of attending an "at quality" site is observed in communities experiencing more risk factors.

Additionally, in communities with a greater number of risk factors, access to high-quality ECE may serve as a protective factor for children, potentially yielding larger effects of quality.[16] *These findings have relevance for informing whether EA is meeting policy goals or whether more targeted services might be needed.*

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[13] 2E2SHB 1491 Early Start Act of 2015; Department of Early Learning. (2017). *Racial equity initiative data report.* Olympia: Washington.

[14] Blodgett, C., & Houghten, M. (2018). *Every child school ready: Community, school, and student predictors of kindergarten readiness and academic progress.* Olympia: Washington and Cushon, J.A., Vu, L.T.H., Janzen, B., & Muhajarine, N. (2011). Neighborhood poverty impacts children's physical health and well-being over time: Evidence from the Early Development Instrument. *Early Education and Development, 22*, 183-205.

[15] See Blodgett & Houghtten (2018) for detailed discussion on this point.

[16] Burchinal, M., Roberts, J.E., Zeisel, S.A., Hennon, E.A., & Hooper, S. (2006). Social risk and protective child,parenting, and child care factors in early elementary school tears. *Parenting, 6*, 79-113 and McCartney, K., Dearing, E., Taylor, B.A., & Bub, K.L. (2007). Quality child care supports the achievement of low-income children: Direct and indirect pathways through caregiving and the home environment. *Applied Developmental Psychology, 28*, 411-426.

Coaching and Quality Ratings

Following enrollment in Early Achievers, child care providers have access to coaching supports aimed at quality improvement and preparation for rating. Coaching services are tailored to site needs. Coaches may work directly with facility directors and/or staff to set goals and provide feedback, connect facilities to additional resources and training, and facilitate group training sessions.[17]

Coaching is believed to be one of the main mechanisms for quality improvement. Research indicates that coaching can improve the quality of caregiver-child interactions and the learning environment, which in turn enhances children's developmental growth.[18]

In this report, we will explore coaching receipt prior to initial ratings, as well as patterns of association between coaching receipt and initial quality ratings. Given the central role of coaching services posited in Early Achievers quality improvement processes and ratings, a better understanding of coaching service receipt can help to inform future program decisions. The nature of Washington's data sources for Early Achievers and coaching services do not allow us to rigorously explore a causal relationship between coaching and site quality ratings or child outcomes.

[17] Child Care Aware of Washington regional offices provided coaching services to non-ECEAP child care sites during our study period.

[18] Egert, F., Fukkink, R.G., & Eckhardt, A.G. (2018). Impact of in-service professional development programs for early childhood teachers on quality ratings and child outcomes: A meta-analysis. *Review of Educational Research, 88*, 401-433.; Pianta, R., Hamre, B., Downer, J., Burchinal, M., Williford, A., LoCasale-Crouch, J. . . . Scott-Little, C. (2017). Early childhood professional development: Coaching and coursework effects on indicators of children's school readiness. *Early Education and Development, 28*, 956-975.

III. Data

Data Sources and Key Variables

For all analyses, we use state administrative records. Data come from the Department of Children, Youth, and Families (DCYF); the Office of the Superintendent of Public Instruction (OSPI); and the Department of Health (DOH). The Education Research and Data Center (ERDC)[19] provided integrated identity matching for child-level records. We incorporate child-care site neighborhood characteristics from census tract records[20] and school characteristics from OPSI public records. See Appendix for more detail.

Child Care Enrollments

DCYF provided child care subsidy records. Participation in subsidized child care each year is indicated by one or more monthly subsidy payment records during that year. Child care subsidy payment records indicate the specific site(s) where the child was enrolled, as well as enrollment dates, allowing WSIPP to identify care history and Early Achievers quality rating for each site that the child attended.

Early Achievers Ratings

DCYF provided records on subsidy sites' participation in Early Achievers.

For each site in our sample, for each year in our study period, we identify sites' rating levels. Child care subsidy sites are expected to meet EA quality standards for a minimum of a Level 3 rating. In this study, the primary variable of interest compares sites rating Level 3 or higher ("at quality") with sites rated at Level 2 ("not at quality"). Additionally, where relevant, we examine sites rated Level 3+ or higher ("above quality").[21]

Kindergarten Readiness

ERDC provided records for children's kindergarten readiness. Kindergarten readiness is assessed using the Washington Kindergarten Inventory of Developing Skills (WaKIDS), which documents teachers' observations of children's knowledge, skills, and abilities observed within the first two months of entering kindergarten.[22]

Teachers observe children's skills across social-emotional, physical, cognitive, language, literacy, and mathematics domains. Children are considered "kindergarten ready" in a domain if they meet or exceed a benchmark score indicating age-appropriate skills for that domain. Children who meet or exceed the benchmark in all six domains are considered "kindergarten ready." Kindergarten readiness will be the primary outcome of interest in this report.[23]

[19] Additional information is available on ERDC's website.

[20] Manson, S., Schroeder, J., Van Riper, D., Kugler, T., and Ruggles, S. *IPUMS National Historical Geographic Information System: Version 16.0 [dataset].* Minneapolis, MN: IPUMS. 2021.

[21] Licensed child care must rate Level 3, at a minimum, to be considered "at quality." The majority of sites received a Level 3 rating. We further differentiate as "above quality" sites that are rated at Level 3+ or higher. Too few sites rated at Level 4 or 5 to differentiate additional subgroups for analyses.

[22] WaKIDS was legislatively mandated to be part of state-funded full-day kindergarten in the 2012-13 school year (RCW 28A.150.315 and RCW 28A.655.080). All Washington schools were reporting WaKIDS data starting in 2017-18. For more information about WaKIDS and WSIPP's approach to addressing changes in the assessment across our study period see Appendix III.

[23] The appendix will also include parallel analyses with the outcomes "meet/exceed at least 5 out 6 WaKIDS domains." In our sample of children receiving child care subsidies (a low-income sample), less than 40% of kids met the 6/6 standard, compared with about 60% of higher income students (according to the ERDC Early Learning Feedback Report). Because relatively few children in our sample meet the 6/6 standard, it is relevant to investigate whether we can

IV. Analysis Sample

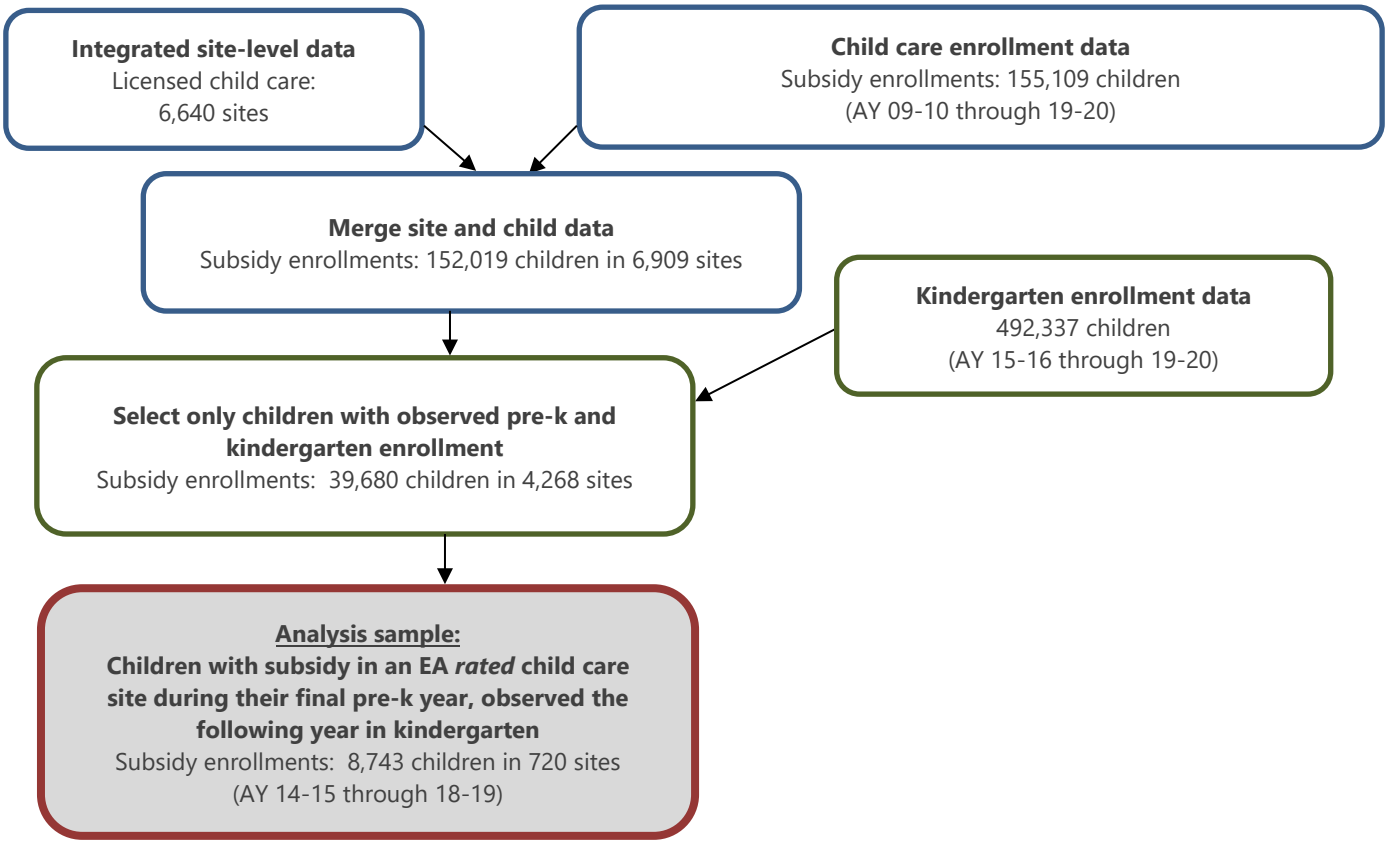
The target population for the analyses in this report is children enrolled in licensed child care sites with subsidies during their pre-k year and observed in their first enrollment in kindergarten in the following year. Due to a range of data limitations, this report does not address children attending pre-k in ECEAP sites.

We selected children attending pre-k during the 2014-2015 through 2018-19 school years and focus on subsidy sites that have received an Early Achievers rating.

Exhibit 3 depicts an overview of the steps we took to construct the analysis sample used in this report. Detail regarding initial cohort selection and sample construction is included in the Appendix. Information about additional sample restrictions specific to each set of analyses is described in Section V.

Exhibit 3

Overview of Early Achievers Sample Construction



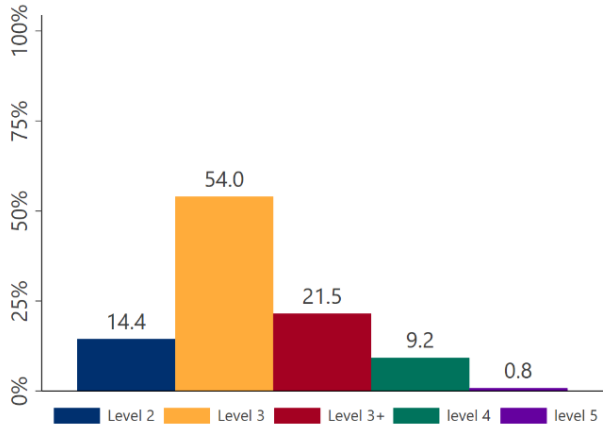
observe associations between Early Achievers quality ratings and meeting expectations for at least 5/6 domains. This outcome measure could reflect a more realistic attainment toward incremental effects of a system change such as Early Achievers. Between 50%-60% of all children in our subsidy sample meet the 5/6 standard.

Sample Description

Depicted in Exhibit 4, roughly 85% of our sample of children in their final pre-k year are enrolled in a site that has received a quality rating of Level 3 or higher. That is, 85% of our subsidy sample attend a site that has received a rating level deemed "at quality."

Exhibit 4

Distribution of Subsidy Pre-K Enrollments in Sites Rated Level 2 through 5



Note:
Information comes from the sample of children enrolled in a subsidy site in the pre-k year between 2015-2019

Summarized in Exhibit 5, children who attend "at quality" sites, on average, are more likely to identify as White and less likely to identify as Black versus children who attend sites not rated "at quality."

Children enrolled in "at quality" programming in their pre-k year are also less likely to have attended three-or-more sites prior to kindergarten—33%, relative to 40% of children attending a site not rated "at quality." Regardless of quality programming in the final pre-k year, the average child has been in subsidy child care for 23 months.[24]

On average, 36% of our subsidy sample met standards for kindergarten readiness (i.e., proficiency in all six WaKIDS domains).

[24] The full list of child-level and site-level descriptive statistics are presented in Appendix V.

Exhibit 5

Child Characteristics, Subsidy Sites 2015-2019

Subsidy site	At quality	Not at quality
Proficiency in 6/6 WaKIDS domains	0.371 (0.483)	0.343 (0.475)
Race:		
Black	0.085 (0.28)	0.155 (0.362)
Hispanic	0.271 (0.444)	0.258 (0.438)
White	0.463 (0.499)	0.380 (0.486)
Other	0.180 (0.384)	0.206 (0.405)
Sites attended pre-k:		
1	0.392 (0.488)	0.344 (0.475)
2	0.275 (0.447)	0.253 (0.435)
3+	0.333 (0.471)	0.403 (0.491)
Months of care pre-k	22.97 (16.19)	22.41 (16.57)
Observations	5,453	921

Note:
Child-level information comes from subsidy site enrollments in the pre-k year from the years 2015-2019.

V. Research Design and Results

WSIPP's assignment in the Early Start Act was to evaluate the relationship between Early Achievers ratings and child outcomes.

In both our previous report and the present report, a major concern for estimating the relationship between site quality and child outcomes is that children who attend quality sites are systematically different from children who do not in ways that could predict academic achievement.

It may be the case that children who would tend toward better outcomes regardless of child care quality are most likely to attend highly rated sites (e.g., have families with greater resources or connections). Alternatively, it may also be the case that children who would tend to have the least positive outcomes regardless of site quality are most likely to attend highly rated sites. For example, children with greater cumulative risk may be given attendance priority in higher quality sites.[25]

These types of child-level selection bias can lead us to incorrectly overestimate or underestimate the importance of site quality for kindergarten readiness.

Consistent with the approach we took in our previous report, we attempt to reduce the impact of selection bias by ensuring that our groups are balanced on child and family characteristics that could predict enrollment in high-quality care and also child school outcomes.[26] With this technique, we can be confident that group differences in observed child characteristics (such as race, sex, birth order, mother's age and education at the time of birth) are not driving differences in outcomes.[27]

Our models additionally account for relevant characteristics of child care sites (e.g., enrollments, region) and census tracts where sites are located (e.g., poverty rate).[28]

[25] ECEAP sites actively prioritize enrollment of children with more risk factors (among eligible and allowable children), as described in the ECEAP performance standards. Non-ECEAP subsidy sites do not follow uniform eligibility or enrollment guidelines. Sites with ready access to child mental health supports or direct training in offering trauma-informed care may be more likely to accept children with greater social and emotional needs, as discussed in the Health Care Authority. (2016). *The children's mental health work group: Final report and recommendations.* Olympia: Washington.

[26] Specifically, we use a statistical matching technique called entropy balancing. Detailed discussion regarding entropy balancing is present in Appendix V and in Goodvin et al. (2020).

[27] We match on child race, sex, age at kindergarten enrollment, tenure in pre-k care, pre-k site stability, language, mother's age, education, and marital status at birth, premature birth, and birth order. We also match on kindergarten school characteristics, including total enrollment, racial makeup, percentage of enrolled students in the free or reduced-priced meals program, and percentage of enrolled students with a diagnosed disability.

[28] At the site level we account for monthly enrollment, percentage of enrollees in subsidy care, years-in-operation, coaching receipt, initial rating, primary language of instruction, and location region. We control for the following census tract characteristics: population total and racial demographics, proportion below a bachelor's degree, proportion English as a second language, proportion renting housing, proportion with household income below the 80% median, median household income, and unemployment rate. All models additionally control for year fixed effects and years since school has implemented WaKIDS.

In our second report, we found that on average, children with subsidies who are attending child care sites that were rated "at quality" are 10% more likely to achieve kindergarten readiness (i.e., proficiency in all six WaKIDS domains) than those who attend sites not yet rated "at quality".[29]

As previously mentioned, a site that has completed the Early Achievers rating process can receive a rating Level 2-5. A site is "not rated at quality" if it has received a rating Level 2. A site is rated "at quality" if it has received a rating level greater than 2 (i.e., Level 3, 3+, 4, or 5).

In this section, we use the same methodological approach as in our second report. We expand upon our previous analysis and examine how the positive association between quality ECE participation and kindergarten readiness differs across the duration of enrollment in high-quality child care and neighborhood characteristics of child care sites. For more discussion on the methodology and empirical approach, see Appendix V.

Despite our comprehensive research design, we ultimately cannot rule out the possibility that our results are influenced by selection bias. Therefore, our findings in all subsequent analyses *should not* be interpreted as cause-and-effect relationships.

In addition, we explore how site characteristics predict different levels of coaching service receipt. Coaching is intended to be a prime mechanism through which sites participating in Early Achievers are expected to improve program quality.

As noted earlier, our focus in this report is children with subsidies attending licensed child care sites. We are unable to include children enrolled in ECEAP for this report due to a range of data limitations.

There are very few ECEAP sites that are not rated "at quality" (nearly all sites meet EA expectations by receiving a Level 4 rating); therefore, further dividing the sample and reliably estimating differences across child and neighborhood characteristics is not possible.

For our examination of coaching receipt, records of coaching prior to the initial rating are only available for non-ECEAP child care sites.[30]

Research Question 1: Quality Care Tenure

First, we examine how different durations of exposure to child care rated "at quality" predict kindergarten readiness.

We previously found that children who attend a site with a rating level that is "at quality" in the year before kindergarten are 3.5 percentage points more likely to achieve proficiency in all six WaKIDS domains (i.e., "kindergarten ready") than children who attend a site that did not receive a rating level "at quality." On average, this implies that children in "at quality" sites are roughly 10%[31] more likely to be kindergarten ready than those who attend a site not yet rated "at quality."

[29] Although our model accounts for several confounding factors, we ultimately cannot rule out the possibility of selection bias. Therefore, our finding is an *association* between higher quality care and kindergarten readiness, we do not estimate a *causal* relationship.

[30] ECEAP contractors and subcontractors were responsible for quality improvement and rating readiness efforts at their own sites as part of regular operations. Data on these efforts were not systematically tracked in an administrative data system.

[31] Given that the average probability of kindergarten readiness is 0.36 and the estimated coefficient value is 0.035, the estimated impact is 0.035/0.361=9.7%

We expand our previous model to allow for the following two comparisons to be made:

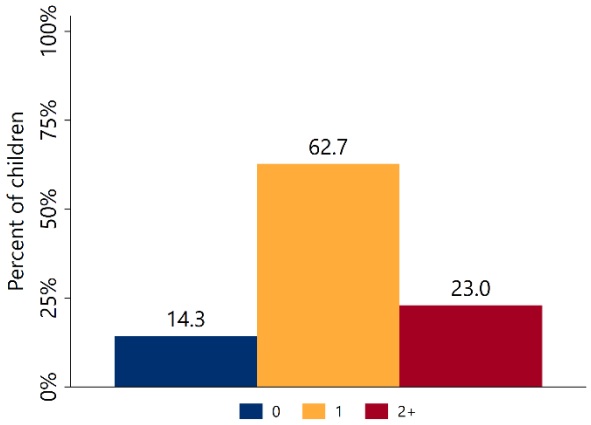
1) One year of "at quality" care vs. no "at quality" care
2) Two or more years of "at quality" care vs. no "at quality" care

Note, in this section, when we refer to "years of care" we mean years prior to *and* including the pre-k year. In addition, "years of care" need not be continuous and uninterrupted (e.g., a child in quality care during the years 2015 and 2017 would be categorized as exposed to quality care for two years, where 2017 is the year right before kindergarten attendance).[32]

The distribution of cumulative "at quality" care among children attending a rated site in the pre-k year is depicted in Exhibit 6.[33]

Exhibit 6

Years of Care in a Site Rated "At Quality"



Note:
Information comes from the sample of children enrolled in a subsidy site in the pre-k year between 2015-2019.

Roughly 14% of children (in their pre-k year) are in child care that has received an EA rating Level 2, below the expectations for rating "at quality." Most of our sample are exposed to up to one year of child care in a site rated "at quality" in the pre-k year (62%), followed by children exposed to "at quality" child care for two or more years (23%).[34]

[32] A child is categorized as receiving "one year of care" if they have attended 1-17 months of care, and they are categorized as receiving "two-plus years of care" if they have received more than 17 months of care. Our key results are qualitatively robust to alternative definitions of one and two years. In analyses not presented here, we also look at the relationship between "months of at quality care" and kindergarten readiness; we find that on average one more year of "at quality" care does not have a significant impact on WaKIDS domain readiness.

[33] 3.2% of children in our sample experienced quality care previous to the pre-k year but not in the pre-k year; these children were dropped from the analyses in this section. Therefore, children in the "0" group (i.e., the comparison group) are children who were never exposed to quality ECE programming in our sample.

[34] In our sample, the maximum duration of care in a site rated "at quality" is 5.5 years. Among children who are exposed to "at quality" child care for two or more years, 66% have been exposed for two years and 25% have been exposed for three years. Only 9% of our sample—180 children—have been in child care rated "at quality" for more than three years.

Exhibit 7 depicts information regarding the number of months children spend in child care across each of the three groups we defined in Exhibit 6. In our sample, the average child with up to one year of "at quality" child care exposure has experienced a total of 27 months of subsidized child care with 8.5 of those months (about 31% of their total duration) spent in a site rated "at quality." The average child with two-or-more years of care rated "at quality" spent 42 months in subsidy child care with 28 months (66% of their total duration) spent in a site rated "at quality".[35]

Exhibit 7

Months in Child Care by Duration of Exposure to "At Quality" Care

	Years in "at quality" child care		
	0	1	2+
Months of subsidy care in the pre-k year	6.71	6.39	9.78
	(4.10)	(3.91)	(3.37)
Months of subsidy care, ever	32.41	26.79	42.47
	(17.71)	(17.40)	(14.47)
Months of subsidy care rated "at quality," ever	0	8.52	28.02
		(4.73)	(8.87)
Observations	798	3,501	1,955

Notes:
Information from children enrolled in subsidy care in the pre-k year between 2015-2019 (historical enrollment information goes back to 2010).

Results exploring how the duration of quality ECE participation relates to kindergarten readiness are reported in Exhibit 8.

In Exhibit 8, the estimate on the left indicates there is no practically or statistically significant difference in kindergarten readiness for children who participate in up to one year (the pre-k year) of child care rated "at quality" versus those who never attend a site that has received a rating level that is "at quality."[36]

The estimate on the right in Exhibit 8 indicates that attending a subsidy site rated "at quality" for two or more years versus attending a site not rated "at quality" predicts a 5.8-percentage point higher probability in kindergarten readiness. Given that the average rate of kindergarten readiness is 0.36, this translates to a *16% higher likelihood of kindergarten readiness*.[37]

[35] Our models control for "months of total subsidy care enrollment" (regardless of quality level). We do this to ensure we estimate the impact of duration of *quality care* on kindergarten readiness distinctly from the impact of duration of any care.

[36] If we limit the sample to children who have been in care in the pre-k year for at least 3-months, 6-months, and 9-months the impact of one year of "at quality care" remains non-significant.

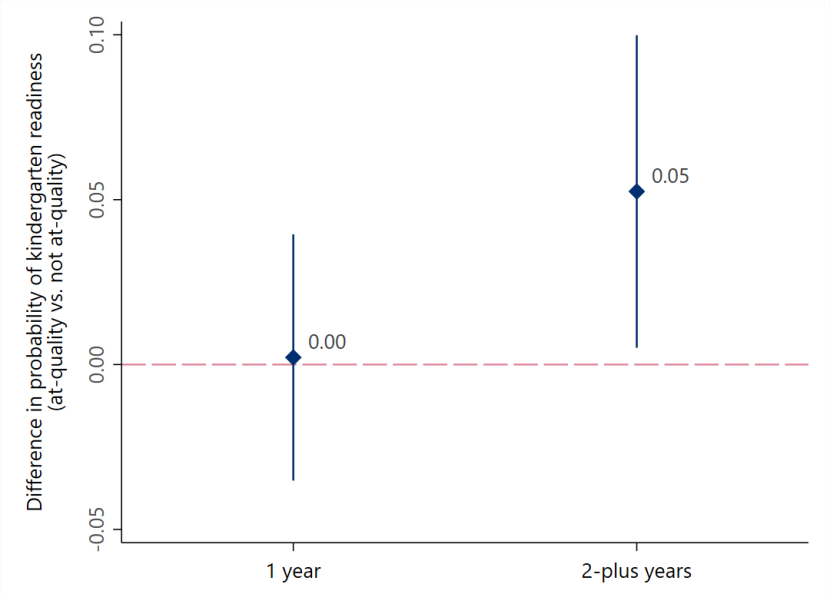
[37] In supplemental analyses, we separate the category "two years of at quality care" from "three-plus years of at quality care". We find that children with two years of "at quality" care are 6-percentage points more likely to be kindergarten ready, relative to children with no at quality care. Attending a site rated "at quality" for three or more years predicts a 4-percentage point higher probability of kindergarten readiness, relative to children with no "at quality" care. However, this result is imprecisely estimated due to the small sample of children in quality care for three or more years. Additional analysis finds that "at quality" care for two or three plus years predicts greater kindergarten readiness relative to one year of "at quality" care. However, there is not a significant difference in outcomes when comparing children with two years of "at quality" care to children with three plus years. These analyses can be found in Appendix V.

Our results suggest that the positive association between attending a subsidy site that has rated "at quality" in the pre-k year and kindergarten readiness is driven by children exposed to quality care for more than one year.

Due to small sample size restrictions, we cannot rigorously examine how our findings differ across measures of continuous annual attendance and site attendance stability (i.e., the number of different child care sites that children attend).[38]

Exhibit 8

Years of "At-Quality" Child Care (Versus No "At-Quality" Care) And Proficiency in All 6 WaKIDS Domains



Note:
Results depicted are the marginal effects and their corresponding 90% confidence interval estimated from a single logistic regression model.

Coefficient value: Represented by the diamond, is the *estimated* relationship between treatment and outcomes. If we multiply the coefficient value by 100, it is the percentage point difference in outcomes between the treatment and comparison group. For example, in Exhibit 8 above, the first diamond tells us that the difference in the probability of proficiency in all 6 WaKIDS domains between children in a quality ECE program for one year versus zero years is 0.0022 x 100=0.22 percentage points.

Confidence interval: Represented by the lines on either side of the diamond, is the range of values that likely include the *true* treatment effect. In Exhibit 8 above, the first confidence interval suggests that the true impact of attending one year of quality care and proficiency in all 6 WaKIDS domains lies between a value of -0.042 and 0.047 (i.e., -4.2 to 4.7 percentage points).

[38] In our sample about 80% of children are in continuous annual care, and 80% of children attend only one child care site in their pre-k year.

Research Question 2: Neighborhood Social Vulnerability

In this section, we examine how the positive association between attending a subsidy site rated "at quality" and kindergarten readiness varies across site neighborhood vulnerability characteristics. [39]

We define neighborhood (i.e., census tract) risk using the CDC's Social Vulnerability Index (SVI) database. In this context, "social vulnerability" refers to the potential negative effects on communities caused by external stressors on human health. The SVI was designed to help local officials identify communities that need support during a disaster. However, studies have established that the SVI can be used to examine community vulnerability in contexts other than emergency preparedness.[40]

Overall vulnerability (of a tract) is constructed from a plethora of social conditions including high poverty, low homeownership rates, and lack of transportation access. The SVI for a given neighborhood is a number between zero and one, where one is the highest level of vulnerability.[41]

The overall SVI comprises four subcomponents (defined by the CDC as): socioeconomic status index; household composition and disability index; race, ethnicity, and language index; and housing type and transportation index.[42]

For this analysis, we rank each census tract from highest to lowest SVI value (i.e., from most vulnerable to least vulnerable). We then estimate a model that allows for tract SVI ranking to interact with the impact of attending pre-k child care rated "at quality." In particular, we compare the impact of the "at quality" rating level for sites in tracts ranked in the top 25% of the SVI (i.e., more vulnerable) versus all sites in tracts ranked lower than the top 25% of the SVI (i.e., less vulnerable).[43]

In this section, our analysis sample is restricted to children in pre-k subsidy care in the years 2016 and 2018; these are the years for which SVI measures are available.

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[39] The neighborhood information we use corresponds to the census tract location of the pre-k site attended and *not* the child's place of residence (we do not observe where children in the sample reside, only where they attend child care).

[40] Gay, J.L., Robb, S.W., Benson, K.M., & White, A. (2016). Can the Social Vulnerability Index be used for more than emergency preparedness? An examination using youth physical fitness data. *Journal of Physical Activity and Health, 13*(2), 121-130.

[41] Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry/Geospatial Research, Analysis, and Services Program. CDC/ATSDR Social Vulnerability Index 2018 and 2016 Database Washington.

[42] We selected the SVI because it is an established tool that captures a range of potential community risk factors associated with external stressors and/or historical marginalization that are relevant to children's opportunities for school readiness and academic achievement. To maintain fidelity to this established tool, we implement and label variables according to the CDC's definitions. The SVI uses data from the American Community Survey, for more information on data and documentation see CDC SVI Documentation 2018 |Place and Health |ATSDR.

[43] The SVI value, between zero and one, that is assigned to a census tract/county is comparable across the U.S. However, the SVI percentile rank assigned to each census tract (Exhibit 9, Panel A) comes from relative comparison *within* the state of Washington. Therefore, tracts that fall in the top 25% of SVI ranking in WA may not fall in the top 25% SVI ranking nationally.

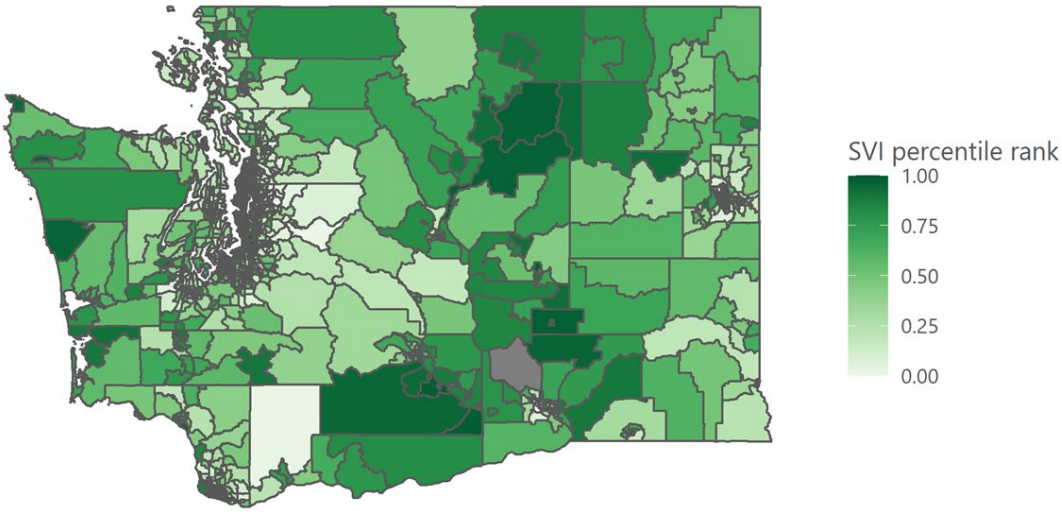
Panel A of Exhibit 9 depicts the SVI ranking of each census tract within Washington (in the year 2018). The darker the shading the higher the SVI ranking. Panel B indicates whether a rated site is located in the top 25% SVI ranking (i.e., "higher vulnerability"), or in the lower 75% SVI ranking (i.e., "lower vulnerability"). Rated sites are denoted with black points. Roughly 45% of rated sites in our sample are located in the top 25% SVI ranking.

For both the "higher vulnerability" and "lower vulnerability" regional categories, the proportion of children enrolled in a site that has received a rating that is "at quality" is 83%.

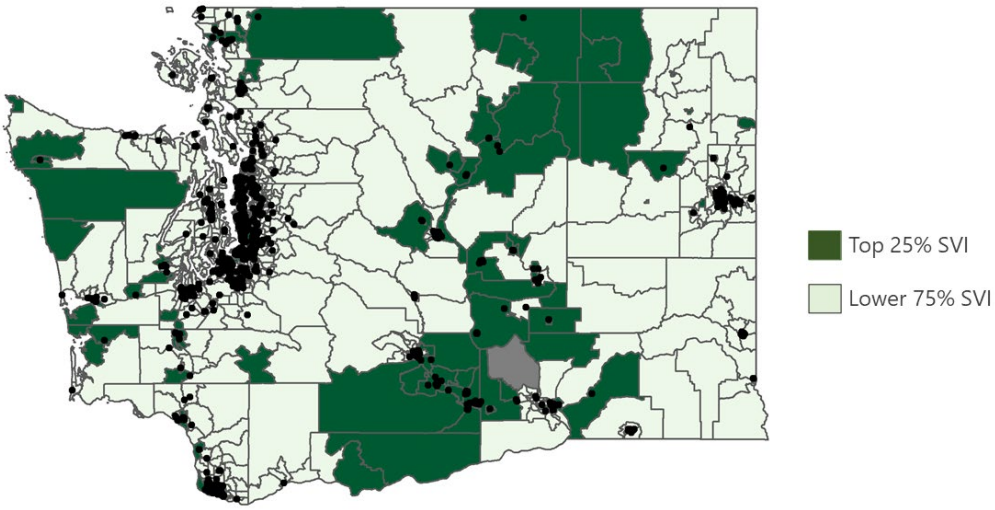
Exhibit 9

Census Tract Social Vulnerability Index (SVI) Percentile Ranking, Washington (2018)

(A) Census Tract SVI Percentile Rank



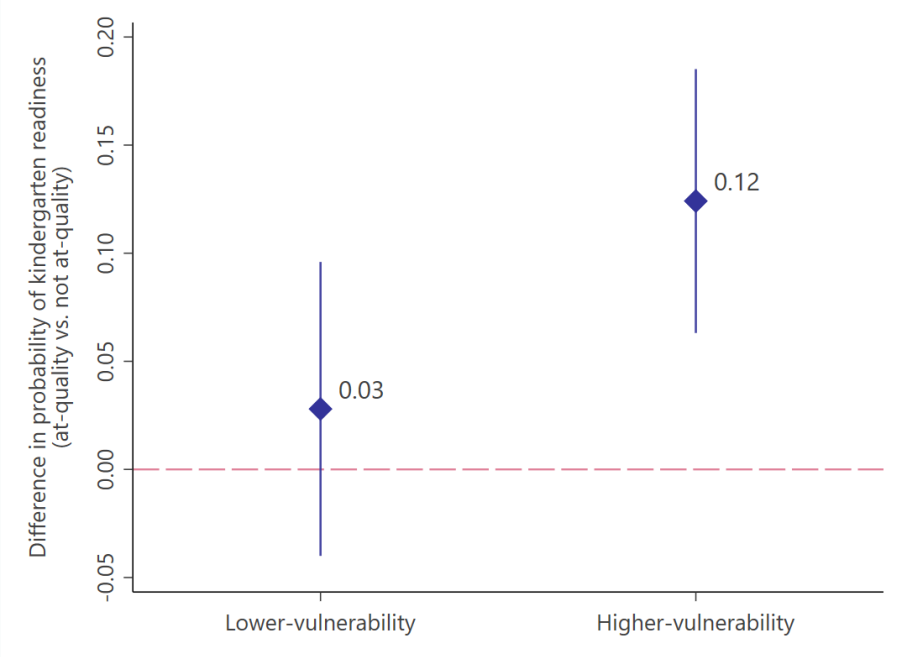
(B) Site Location, By Census Tract Vulnerability Rank



Notes:
Maps were generated using SVI data and site-level coordinates from the year 2018.
Black dots represent rated sites.

Exhibit 10

Pre-K Site Rated "At Quality" and Proficiency in All Six WaKIDS Domains, by Social Vulnerability Index Ranking



Notes:
Results depicted are the marginal effects and their corresponding 90% confidence interval estimated from a single logistic regression model.

The results presented in Exhibit 10 summarize the relationship between attending a site rated "at quality" and kindergarten readiness for those who attend a higher-vulnerability site versus those who attend a lower-vulnerability site. Our results indicate *that the significant relationship between attending a site that has received a rating "at quality" and kindergarten readiness is driven by sites that are in "higher-vulnerability" areas* (the estimate depicted on the right).

We find that for children who attend a higher-vulnerability site, attending a site that received a rating "at quality" predicts a 12-percentage point higher likelihood of kindergarten readiness (about 30%) versus attending child care that is not yet rated "at quality." [44]

[44] We conducted parallel analysis with a continuous measure of SVI ranking and find no significant interaction effects. We also explore how quality-level ratings relate to kindergarten readiness for sites located in the top 10% of the SVI ranking. Results from these analyses are reported in Appendix V.

It is important to note, that attending *any* child care center located in a tract ranked in the top 25% of the SVI predicts lower kindergarten readiness.[45] However, attending a site rated "at quality" in these more vulnerable neighborhoods reverses that negative association. That is, *quality improvement in child care sites that serve children with subsidy works towards closing the gap in kindergarten readiness associated with neighborhood disadvantage.*

As previously mentioned, an SVI score is composed of four individually rated subcomponents:

1) Socioeconomic status
2) Household composition/disability
3) Race/ethnicity/language
4) Housing type/transportation

We group sites by whether they are higher vulnerability or lower vulnerability separately for each of the four SVI components and replicate the analysis conducted in Exhibit 10 for each component. The results from these analyses are presented in Exhibit 11.

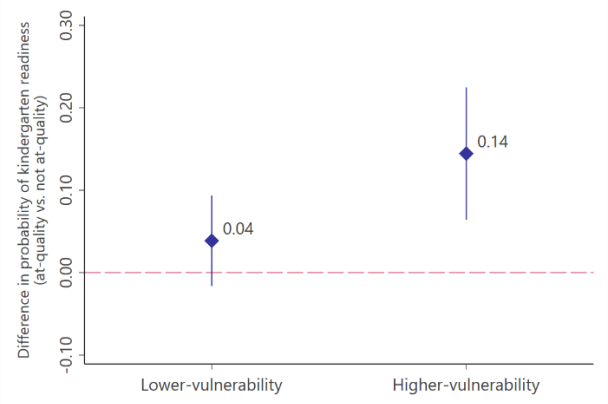
Results from these analyses support our finding that the positive association between quality and kindergarten readiness is driven by attendees in sites in higher-vulnerability neighborhoods regardless of which component of vulnerability is being compared.

[45] This result can be found in Appendix V.

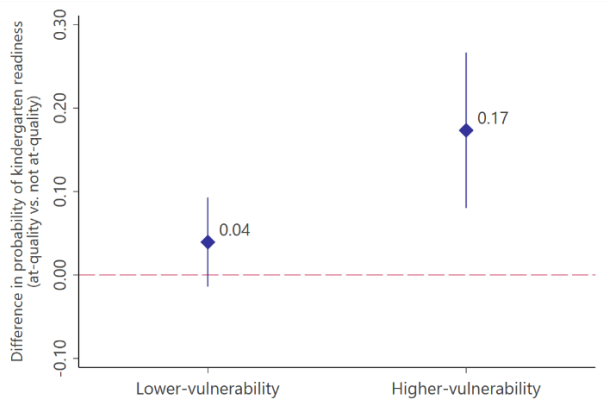
Exhibit 11

Pre-K Site Rated "At Quality" and Proficiency in all Six WaKIDS Domains, by Social Vulnerability Index (SVI) Component Ranking

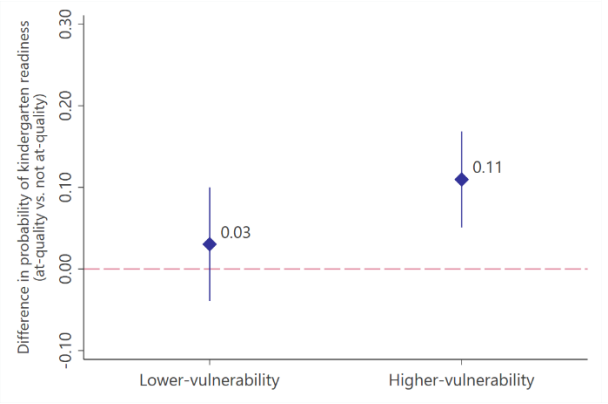
(A) SVI component 1: Socioeconomic



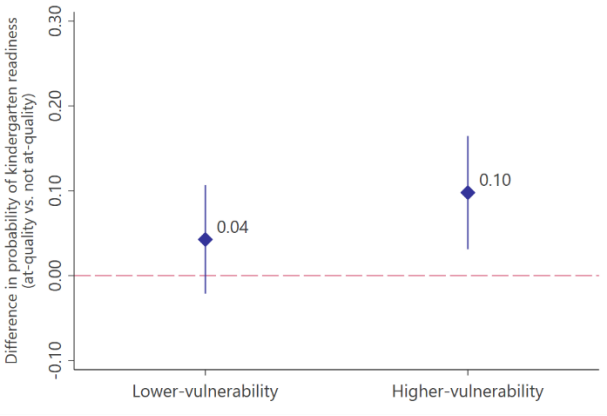
(B) SVI component 2: Household composition/disability



(C) SVI component 3: Race/ethnicity/language



(D) SVI component 4: Housing type/transportation



Notes:

Results depicted within a panel are the marginal effects and their corresponding 90% confidence interval estimated from a single logistic regression model.

Each panel corresponds to a different regression model.

Research Question 3: Coaching

In this section, we explore variation in uptake and intensity of coaching services leading up to initial ratings. We also explore patterns of association between coaching receipt and quality ratings. Specifically, we compare sites that received no coaching to those that received any amount of coaching. Among sites that did receive coaching, we also compare those with lower-intensity versus higher-intensity coaching.

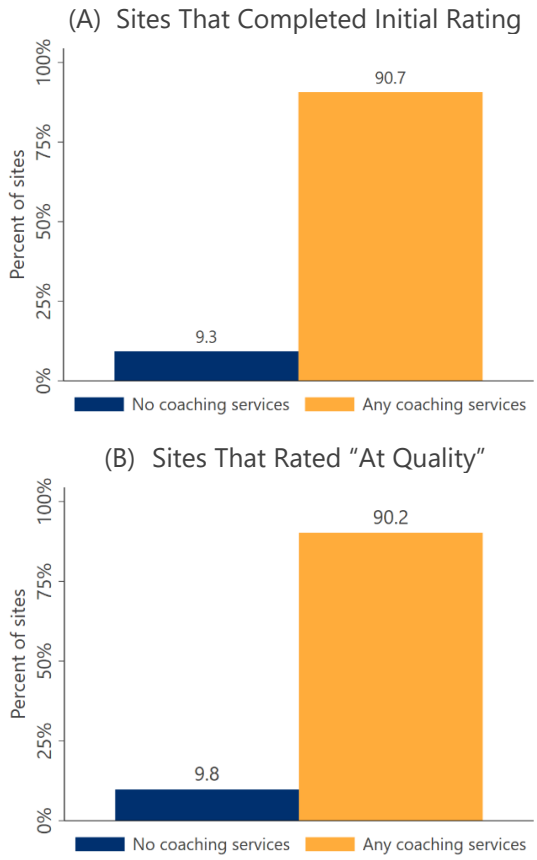
Coaching services provide site-specific supports designed to promote quality improvement. Coaching consists of consultation, mentoring, technical assistance, and other services.

In this study, we focus on coaching services that occur between sites' completion of EA orientation and required trainings (i.e., "Level 2 complete"), and the date of the initial rating. We do not observe information pertaining to coaching services after a site completes its initial rating.[46]

EA coaching service receipt is optional. Exhibit 12 summarizes coaching service uptake. In our sample of subsidy child care sites that complete an initial QRIS rating, roughly 91% of sites received coaching services.[47] Among sites that received an "at quality" rating level, roughly 91% received any coaching services.

Exhibit 12

Coaching Service Uptake



Note:
Rated subsidy sites with enrollments observed in the years 2010-2019.

Initially, we compared characteristics of rated sites that have received coaching services to those that have not. The full table of descriptive statistics by coaching receipt can be found in Appendix V.

[46] Coaching records come from Child Care Aware of Washington (CCA) and are considered to be complete only for child care subsidy sites' initial rating. Accordingly, this analysis is limited to the subsample of initial ratings. Sites that do not initially rate at quality are required to complete a re-rating process. Additionally, sites renew ratings on a three-year cycle. Questions about coaching and continuous quality improvement leading up to these later ratings cannot be addressed with available data. We focus on coaching between the first coaching contact following Level 2 complete through date of last coaching contact prior to rating date. Information from CCA indicated that prior to achieving Level 2 complete, coaching contacts primarily consist technical assistance related to EA participation, which would not be expected to relate directly to quality improvement or child outcomes.

[47] For these analyses we relax minimum attendance size and years-in-operation restrictions that were previously applied for the outcomes analyses.

Sites that receive any coaching services have smaller monthly average enrollment sizes than sites that receive no coaching services—17 children versus 32 children—although both sites have a similar proportion of enrollees with subsidized care (about 54%).

Sites that receive coaching services have a higher proportion of enrollees who identify as Hispanic—35% versus 27%—and a lower proportion who identify as other Black, Indigenous, and people of color (BIPOC) categories.

On average, subsidy sites that receive coaching services are more likely to have a language of instruction other than English, have been observed in operation one year longer, and are less likely to be a child care center. That is, sites that receive coaching services are more likely to be family home care than sites that do not receive coaching services.

With respect to geographic region, a larger proportion of sites that do not receive any coaching services are in King and Pierce County versus sites that do engage in any coaching activities—64% versus 45%.

To further explore observable differences between sites that engage in coaching services and those that do not, we compare measures of neighborhood vulnerability and child care access. Particularly, we compare Social Vulnerability Index rankings and the proportion of unmet child care needs.[48] Due to data availability, information for these descriptive statistics comes from the year 2018 only (see Appendix V).

Recall that higher SVI rankings indicate relatively higher neighborhood vulnerability. Our estimates indicate that sites that did not receive coaching services are more likely to be in lower vulnerability tracts, and sites that did receive coaching services are more likely to be in higher vulnerability tracts.

Additionally, on average, rated sites with no coaching services are in tracts with a smaller proportion of unmet child care needs versus sites that did receive coaching services—68% versus 72%

[48] Data pertaining to unmet child care need in the year 2018 were provided by DCYF. DCYF calculates unmet child care need as equal to the supply or "slots" (based on facilities licensing, subsidized child care, and ECEAP/Head Start counts), divided by the demand or "need" (estimated from American Community Survey data, and defined as all available parents in the labor force).

Next, we look at the initial rating level by coaching status. This information is summarized in Exhibit 13. In our sample, 86% of sites that did not receive coaching services prior to their first rating were rated "at quality" (i.e., Level 3 or higher), as seen in Panel A. Among sites that received any amount of coaching, 82% were rated "at quality."

Panel B of Exhibit 13 shows that among sites in our sample that did not receive any coaching services prior to their first rating, 40% were rated as Level 3+ or higher. Among sites that received any amount of coaching, 21% were rated as Level 3+ or higher.

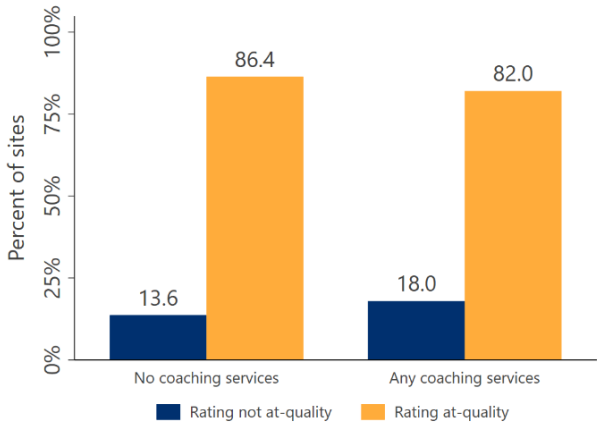
The potential (unobserved) differences between child care facilities that engaged in coaching services and those that did not make it difficult to isolate the true role coaching services play in supporting quality programming and ultimately improving child outcomes.

Particularly in the absence of any measures of baseline quality, or more detailed systematic information about sites and staff, a reliable and unbiased estimate of the role of coaching is not possible. Although Exhibit 14 shows that more sites with no coaching rate "at quality," it is possible that sites already operating at high quality, or in areas with greater resources, are less likely to opt into coaching. It is therefore likely that any statistical analysis will undervalue the effect of coaching.

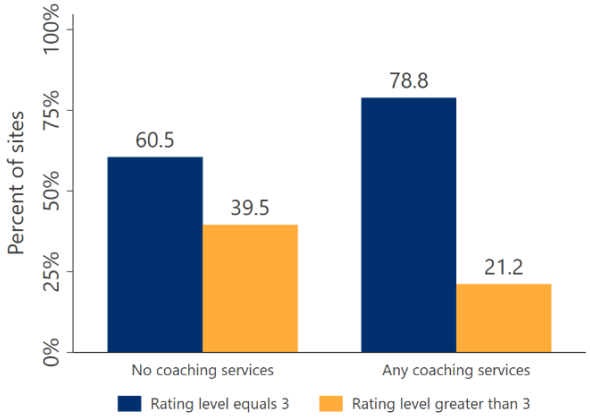
Exhibit 13

Initial Rating Level by Coaching Status

(A) Rating "At Quality" Versus Not Yet "At Quality"



(B) Rating at Level 3 Versus Greater Than Level 3



Note:
Rated subsidy sites with enrollments observed in the years 2010-2019.

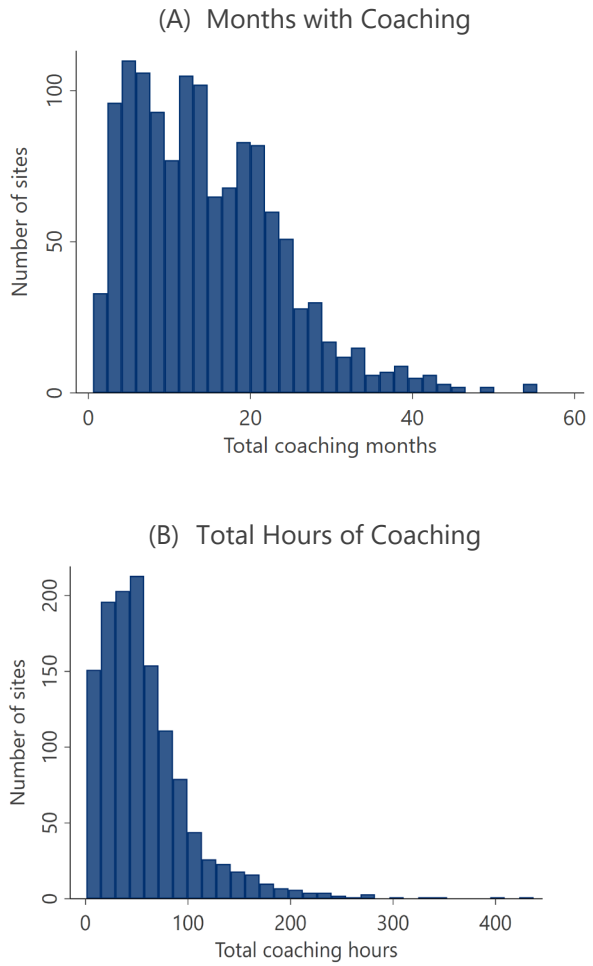
In our sample, the proportion of child care sites that do not receive coaching is relatively small (<10%), so we now focus attention on characteristics of sites with varying levels of coaching receipt.

Data constraints do not permit us to address the nature of coaching services received by individual sites; we only observe the duration and intensity of coaching prior to the initial rating.[49] Particularly, we observe how many months a site engaged in coaching services, and we observe the total number of hours of coaching services.

The distribution of months of active coaching receipt is presented in Panel A of Exhibit 14. The distribution of total hours of coaching receipt is presented in Panel B.

Exhibit 14

Distribution of Coaching Duration



[49] Coaching supports are intended to support sites' individual needs. Accordingly, the specific supports coaches provide vary considerably by site and over time as sites progress through EA. Examples of activity might include training around the observational assessments (ERS and CLASS) used in on-site data collection for rating the learning environment and interaction, providing feedback and consultation with sites regarding materials and space classrooms, or sharing resources for professional development.

The average site spends 14.6 months and 59.2 hours receiving coaching services. However, sites vary widely in how much coaching they receive with some sites receiving as little as one hour and as much as 430 hours of coaching. Further information regarding the duration of coaching receipt is presented in Exhibit 15. We define a "lower-intensity" site as one that received a total number of coaching hours that falls in the bottom half of the distribution (i.e., below the median). We define a "higher-intensity" site as one that received a total number of coaching hours that falls in the top half of the distribution.

Lower-intensity coaching sites have smaller average enrollments, are less likely to be a child care center (and more likely to be a family home), and are more likely to have a primary language of instruction that is not English. Lower-intensity coaching sites are also less likely to be located in the top 50% of most vulnerable neighborhoods.

These descriptive statistics can be found in Appendix V.

Exhibit 15

Coaching Duration Statistics

	Median	Min	Max
Total months of active coaching	13.30	0.57	55.4
Total hours of active coaching	49.19	0.67	455.6

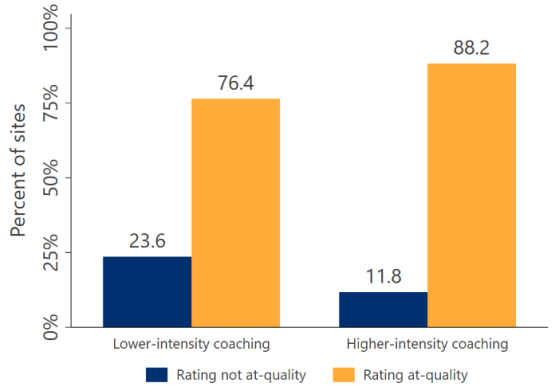
Exhibit 16 depicts quality rating level receipt among "lower-intensity" sites versus "higher-intensity" sites. Among sites in our sample that received any coaching services, 88% of sites that received higher-intensity coaching received an initial "at quality" rating, compared with 76% of lower-intensity coaching sites (Exhibit 16, Panel A).

Panel B of Exhibit 16 shows that among sites in our sample that received higher-intensity coaching services, 17% were rated as Level 3+ or higher, compared with 26% of sites that received lower-intensity coaching.

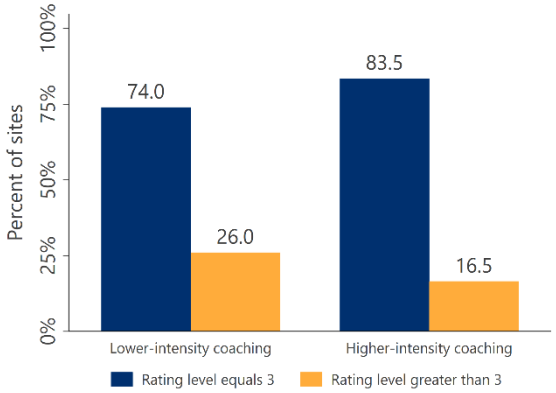
Exhibit 16

Initial Rating Level by Coaching Intensity

(A) Rating "At Quality" Versus Not Yet "At Quality"



(B) Rating at Level 3 Versus Greater Than Level 3



Note:
Rated subsidy sites with enrollments observed in the years 2010-2019.

It is important to emphasize again here that the information we present is descriptive, and we cannot conclude that more coaching service receipt *causes* quality rating outcomes.

As before, there are likely consistent differences that we are unable to observe between child care facilities that engage in higher or lower amounts of coaching, which in turn makes it difficult to isolate the role coaching service intensity or duration plays in supporting quality programming and ultimately improving child outcomes.

VI. Limitations

The major limitation of this study is the inability to randomly assign children with a subsidy to child care providers rated "at quality," and the inability to randomize site-level coaching participation or location. A random assignment would increase our confidence that the group differences we estimate are due to quality improvement and not due to other unobserved characteristics of children or sites.

In the absence of random assignment, our study is further limited by the absence of baseline site quality information from the years before QRIS participation. Without information about site-level quality prior to EA participation, we cannot directly address change in quality, or whether a change in quality corresponds to change in child outcomes.[50]

Additionally, baseline site quality data is of prime importance for any analyses regarding the impact of coaching on quality improvement and subsequent child outcomes. Our ability to conduct analyses regarding the role of coaching is also hindered by the absence of information about the specific coaching services received by a site or about the coaches themselves.

The interpretability and generalizability of our results are additionally limited by the fact that comparison groups throughout the analysis are relatively small. Overall, only 15% of our sample attend a site rated below quality. This lack of variation in quality ratings—the predictor of interest—leads to some statistical uncertainty in our estimate of the overall positive relationship between attending a site that received an "at quality" rating and kindergarten readiness. The uncertainty is highlighted when we explore how this relationship differs across subgroups such as neighborhood risk level, or years of exposure to quality care. Furthermore, the small comparison group did not allow for examining how the relationship between rating and child outcomes varies across other relevant features such as child care stability and continuity.

For the ECEAP sample that was included in our previous report, the distribution of quality ratings is even more extreme (90% of ratings meet the Level 4 requirement). This completely precluded our ability to conduct parallel analyses in the ECEAP sample. As a result, we cannot draw conclusions about how duration or neighborhood characteristics may intersect with EA quality ratings for children in ECEAP.[51]

[50] Although we do observe both initial ratings and later ratings for each site, ultimately too few sites receive a later rating that is different from their initial rating to support a valid analysis of the impact of change in quality ratings.

[51] ECEAP and licensed child care differ in a number of ways, including program expectations and performance standards, staffing, child population served, and Early Achievers process and requirements. Cumulatively, these differences prevent us from predicting patterns in the ECEAP sample based on the present analysis and results in the child care subsidy sample.

A final point about drawing policy-relevant inference from this study regards the use of overall quality ratings as predictors. These ratings reflect a snapshot of quality at the site level, averaged across classroom observations and across points on five different standard areas. Some standard areas—in particular, "Learning Environment and Interactions"—are expected to be more directly tied to child outcomes than others.[52] From a research perspective, relying on overall quality ratings may mask underlying variation in quality and likely attenuates estimated associations with child outcomes. Incomplete reporting in administrative data limited our ability in this evaluation to explore how ratings on specific standard areas, or for children's specific classroom experiences, predict child outcomes.

More discussion regarding our general methodological approach and the limitations presented by the research design and data can be found in Appendix V and in WSIPP's Early Achievers report two.[53]

[52] Fox, L., McCullough, M., Caronongan, P., & Herrmann, M. (2019). *Are ratings from tiered quality rating and improvement systems valid measures of program quality? A synthesis of validation studies from Race to the Top-Early Learning Challenge states* (NCEE 2019- 4001). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

[53] Goodvin et al. (2020).

VII. Discussion

Conclusions

In WSIPP's Early Achievers report two, we examined the relationship between *any exposure* during the final pre-k year to an early childhood education (ECE) site meeting EA quality standards (i.e., rated "at quality") and kindergarten readiness. Children who attend a site meeting quality standards in the year before kindergarten are more likely to be ready for kindergarten in the following year (i.e., meet or exceed developmental expectations on all six WaKIDS domains).

The purpose of this report was to unpack that overall relationship across two policy-relevant dimensions, duration of quality care and neighborhood characteristics.
From our results we draw the following two main conclusions:

1) *The positive association between attending a child care site meeting EA quality standards and kindergarten readiness is driven by children exposed to quality care for a longer duration than the final pre-k year.*

That is, for children who experienced quality care for two years or more prior to entering kindergarten, receiving "at quality" care in their pre-k year predicted a better likelihood of kindergarten readiness. Attending "at quality" in only the pre-k year does not relate to kindergarten readiness.

2) *The positive association between at quality care and kindergarten readiness is driven by children who attend sites located in neighborhoods with higher social vulnerability as defined by the SVI.*

That is, attending a child care site meeting EA quality standards in a child's final pre-k year predicts kindergarten readiness only for those children who attend sites in higher-vulnerability neighborhoods. Children in these sites may have the most room to gain in kindergarten readiness from child care quality. This could speak to the potential for EA to address existing gaps in kindergarten readiness.

With respect to coaching, our conclusions are less definite. We observed that sites that received some coaching had lower quality ratings on average than sites that received no coaching. We also observed that, of sites that received some coaching, those that received higher-intensity coaching had higher quality ratings on average than sites that received lower-intensity coaching.

However, we cannot make cause-and-effect inferences based on these comparisons. There were a number of observed differences between sites. Given the limited information available regarding sites and staff, unobserved differences are likely present as well. It is impossible to disentangle aspects of coaching from other site characteristics that might influence quality ratings and later kindergarten readiness. This analysis is therefore intended to be descriptive and primarily informative to program development.

Future Work

WSIPP was directed to submit a final Early Achievers evaluation report in December 2022. Our final report will include two main sets of analyses.

First, as directed by the legislature in the 2015 Early Start Act, we will conduct a benefit-cost analysis of Early Achievers. This analysis will explore how the overall benefits (increases in kindergarten readiness) associated with attending a pre-k site rated "at quality"—observed in both subsidy and ECEAP samples—compare with costs of the Early Achievers QRIS, on average.

Second, we plan to examine the geographical availability of early childhood education and child care at sites rated "at quality" and "above quality." This analysis may extend our work on neighborhood risk in this report to address the availability of high-quality child care across communities at differing levels of risk/vulnerability.

Acknowledgments

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We also thank the staff at OSPI and DOH for contributing data to WSIPP's evaluation and their guidance in data use. In particular, Warren Wessling, Kevin Cummings, Joyce Kilmer, Sara Schwartz-Jewell, and Rachael Brown-Kendall at DCYF; Tom Aldrich, Tim Norris, and Jeffrey Thayne at ERDC; Karen Sampson and Sarah Kelley at Child Care Aware; Johnna Lee, DeEtta Simmons, and Gail Joseph at Cultivate Learning; and Lucas Snider at OSPI have graciously answered many questions about programs, data, and WSIPP's evaluation. Scott A. Latham at Princeton University, Vickie Ybarra, Kevin Cummings, and Danielle Fumia provided helpful comments on earlier drafts of this report. Finally, we thank Lijian He, Chasya Hoagland, John Hansen, and Anthony Ellis for their contributions to this work.

Appendix

Early Achievers Evaluation Report Three: *Variation in Links between Quality and Kindergarten Readiness for Children with Childcare Subsidy*

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I. Background

Early Achievers Quality Standard Areas:

Early Achievers quality ratings range from Level 1 to Level 5. The Early Start Act required subsidy sites to earn at least a Level 3 rating and ECEAP sites to earn at least a Level 4 rating. Early Achievers uses a rating structure in which all facilities must meet common foundational requirements, considered a Level 1 or 2, and can earn additional points to be rated at a Level 3 to 5.[54] The number of points earned determines the quality rating.

Level 1 includes licensed or certified child care facilities meeting licensing standards but not enrolled in Early Achievers. Licensed facilities that enroll in Early Achievers complete a series of initial professional development trainings and may then apply for an "Enrolled Level 2" designation.

Level 3 to 5 ratings are achieved by earning points in five quality standard areas:

3) Learning environment and interactions;
4) Child outcomes;
5) Curriculum and staff support;
6) Professional development and training; and
7) Family engagement and partnership.

The learning environment and interactions points are currently based on two standardized observational assessments: The Environment Rating Scale (ERS) and the Classroom Assessment Scoring System (CLASS). Both are validated and widely used assessments covering a range of classroom quality elements.[55] This standard area is weighted most heavily in determining the overall Early Achievers rating, and data collectors complete these assessments for all ECEAP and subsidy sites. All sites must meet minimum threshold scores on the ERS and CLASS to rate at a Level 3, regardless of points earned in other quality standard areas.[56] Sites that do not meet threshold scores are classified as "Rated Level 2."

[54] This structure is commonly referred to as a hybrid structure, referring to a hybrid of the other two QRIS rating structure options: building blocks and points (Early Achievers Operating Guidelines, 2017). QRIS rating structures are described in more detail in Exhibit 12 of this report.

[55] See Gordon, R.A., Fujimoto, K., Kaestner, R., Korenman, S., & Abner, K. (2013). An assessment of the validity of the ECERS-R with implications for assessments of child care quality and its relation to child development. *Developmental Psychology, 49*, 146–160; Gordon, R.A., Hofer, K.G., Fujimoto, K.A., Risk, N., Kaestner, R., Korenman, S. (2015). Identifying high-quality preschool programs: New evidence on the validity of the Early Childhood Environment Rating Scale–Revised (ECERS-R) in relation to school readiness goals. *Early Education and Development, 26*, 1086–1110; and Pianta, R.C., LaParo, KM., & Hamre, B.K. (2008). *Classroom Assessment Scoring System manual: Pre-K*. Baltimore, MD: Brookes, for validation on ERS and CLASS, respectively. Data collectors with Cultivate Learning at the University of Washington undergo extensive initial and ongoing training to ensure observational assessments that meet or exceed developers' standards for reliability.

[56] Each facility must earn a minimum average score of 3.0 on the ERS. According to ERS developers, a score of 3 or 4 falls in the "minimal" quality range (compared with scores of 1 or 2 in the "inadequate" range, 5 or 6 in the "good" range, and 7 in the "excellent" range; see Harms, T., Clifford, R.M., & Cryer, D. (2005). *Early Childhood Environment Rating Scale–Revised.* New York, NY: Teachers College Press. Each facility must also earn a minimum of 2.0 on the Instructional Support/Engaged Support in CLASS and 3.5 on Emotional Support and Classroom Organization/Emotional and Behavioral Support in CLASS. Scores from 1 to 5 are considered by developers to be in the "low to medium" quality range, falling below high-quality scores of 6 to 7 (see Pianta et al. 2008). [57] Education Research & Data Center. (2018). *Early learning feedback report.*

Professional development and training points are automatically calculated through DCYF's administrative data system. Sites choose whether to provide verification of staff education/credentials in the system.

Points in the three remaining quality standard areas are based on a review of site records and documentation. Sites can earn points for documented programmatic implementation of standards in each area. Examples of child outcomes standards include screening for developmental milestones and sharing screening information with families. Curriculum and staff support include using a curriculum that meets developmental guidelines and providing time for staff planning and training. Family engagement and partnerships include providing resources to families in their primary language and partnering with families to determine children's strengths and needs.

II. Data

Exhibit A1 details data sources directly utilized for the present report. Data coverage indicates dates for all data requested. In the present report, our samples reflect a narrower set of cohorts selected to best address the association of pre-kindergarten quality and children's kindergarten outcomes.

Exhibit A1

Data Sources used for Early Achievers Evaluation

Data type	Data systems or reports	Data source	Coverage
Site-level data			
Early Achievers ratings and rating dates	WELS	DCYF	All sites receiving an initial rating, re-rating, or renewal rating in Early Achievers from Jul. 2012 – Apr. 2020.
Early Achievers participation milestone dates	Early Achievers Private Pay Monitoring Report; MERIT Reports	DCYF CCA of WA	All participation milestone dates in monthly MERIT reports (Aug. 2012 - Mar. 2016) and monthly Early Achievers Private Pay Monitoring Reports (Apr. 2016 – Apr. 2020).
Early Achievers consultation and coaching dates	CCA system	CCA of WA DCYF	Pre-rating consultation dates for all licensed facilities working with CCA from Jul. 2012 – Apr. 2020.
Licensed child care facility characteristics	FamLink; WA Compass	DCYF CCA of WA	All licensed child care sites with an active license from Sep. 2009 – Aug. 2020.
Child-level data			
Child care subsidy participation	SSPS	DCYF	All children receiving child care subsidy through WCCC, SCC, or child welfare from Sep. 2009 – Aug. 2020.
Child health at birth; time-varying family characteristics	Birth statistical files	DOH	All live births from Sep. 2008 – Aug. 2016.
Child K-3 program participation and assessment data	CEDARS	OSPI/ERDC	All K-3 children from AY 2014-15 – AY 2020-21 who match an individual identified for ECEAP or child care subsidy in target years.

Notes:
AY = Academic year.
WELS = Web-based Early Learning System.
DCYF = Department of Children, Youth, and Families.
MERIT= Managed Education and Registry Information Tool.
ELMS = Early Learning Management System.
ERDC = Education Research & Data Center.
SSPS = Social Service Payment System.
CCA = Child Care Aware.
DOH = Department of Health.
CEDARS = Comprehensive Education Data and Research System.
OSPI = Office of the Superintendent of Public Instruction.

III. Kindergarten Readiness Assessment

The Washington Kindergarten Inventory of Developing Skills (WaKIDS) is utilized in Washington State public elementary schools to assess children's kindergarten readiness. The WaKIDS is a custom version of the Teaching Strategies GOLD™ developmental assessment (TSG). WaKIDS items represent a subset of objectives and underlying dimensions from the full TSG. The WaKIDS observational assessment is completed by children's teachers in the first two months of children's kindergarten year.

The WaKIDS is a snapshot record of teachers' observations of children's knowledge, skills, and abilities in six domains: social-emotional, physical, cognitive, language, literacy, and mathematics. For each objective and dimension on the assessment, teachers observe children's behavior over a period of time and assign a score indicating where children's demonstrated knowledge and behaviors fall on a developmental continuum. Item scores are then summed across items on a domain. Children are considered to meet "widely held expectations" in a given domain if they meet or exceed a benchmark score indicating that they have acquired a set of age-appropriate skills. Kindergarten readiness is considered for each domain as meeting or exceeding a benchmark score indicating consistent demonstration of the knowledge, skills, and abilities that would be expected of an incoming kindergartner. Children who meet or exceed the indicated score on all domains are identified as "kindergarten ready."[57]

The WaKIDS was piloted in a small number of elementary schools in the 2010-11 and 2011-12 academic years (AYs). Beginning in the 2012-13 AY, WaKIDS administration was made a requirement for funding for full-day kindergarten.[58] Both full-day kindergarten and the WaKIDS were initially implemented in schools with the highest rates of children qualifying for free and reduced-price meals so that the population of children in earlier years is not representative of the full population of Washington kindergarteners. The number of schools implementing WaKIDS steadily increased through the 2017-18 AY, when WaKIDS was implemented in all public elementary schools.[59]

Because WSIPP's evaluation leverages multiple cohorts of students over time, changes that have been made to the assessments themselves during our study period have implications for WSIPP's evaluation. Although the conceptual definition of kindergarten readiness has remained consistent, even small changes in the measurement of an outcome can risk masking or misattributing effects of treatment on variation in that outcome. This is particularly problematic for methods intended to identify treatment effects on aggregate changes in an outcome over time.

In the 2015-16 AY, the specific set of objectives and dimensions included on the WaKIDS was revised based on WaKIDS data from earlier years. WaKIDS objectives/dimensions from 2015-16 through 2019-2020 have remained consistent. Because the 2014-15 AY WaKIDS was based on a different objective set, and we observed discontinuous breaks in the probability of kindergarten readiness on each domain from 2014-15 to 2015-16, we omitted the 2014-15 kindergarten cohort from all analyses.

[57] Education Research & Data Center. (2018). *Early learning feedback report.*
[58] RCW 28A.655.080.
[59] OSPI. *Washington Kindergarten Inventory of Developing Skills.*

Starting in the 2017-18 AY, kindergarten assessment data reflects a new version of the Teaching Strategies GOLD (TSG) assessment. Specifically, Teaching Strategies introduced a version of the assessment designed to cover a developmental progression from birth through 3rd grade (B-3), whereas the previous version covered a developmental progression from birth through kindergarten (B-K).[60] Several simultaneous changes were made to the TSG B-3 version, including the addition of new objectives/dimensions on literacy and math domains, revising response scales to cover more advanced developmental knowledge and behaviors, revising some response scales to update and expand behavioral anchors (descriptions corresponding to objective scores), expanding the scale score range to accommodate the expanded developmental coverage, and finally, adjusting the benchmark scores for widely held expectations and kindergarten readiness based on these changes and new normative data using the TSG B-3 version. These changes all impact consistency of measurement over time for the WaKIDS.

To mitigate the impact of these changes on WSIPP's evaluation, we utilized objective/dimension level data to reconstruct scores for each domain that was as consistent as possible with the TSG B-K version.

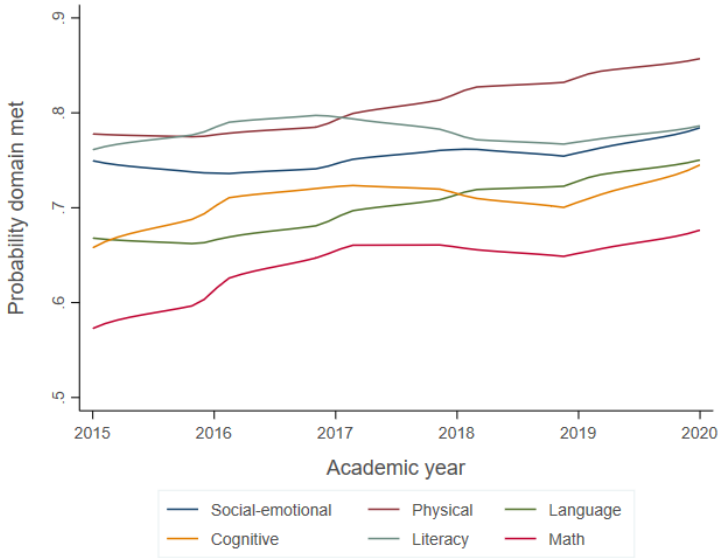
For the WaKIDS we summed objective/dimension scores for each domain. Teaching Strategies' approach in the TSG B-K version to missing objective level data was to impute the mean domain score for each child based on their completed items when at least 80% of items were completed. When fewer than 80% of items in a domain were complete, mean imputation was not used, and the child's domain score was considered missing.[61] We replicated this approach and also checked that all students missing data for their kindergarten readiness flag in the original data we received from OSPI/ERDC were also missing this flag in our reconstructed data. We then applied WaKIDS benchmark cutoff scores as documented by Teaching Strategies.[62] No new items were added to the WaKIDS assessment when the B-3 version was introduced, and only the WaKIDS literacy raw score cutoff changed starting in 2017-18. This change was likely due to adjustments in the underlying response scales for dimensions in the literacy domain so that the B-K and B-3 cutoff versions were functionally equivalent. Based on inspection of the dimension response scales and data, we determined that the best approach to maintaining consistency over time in the kindergarten readiness classification was to apply the B-K version cutoffs through 2016-17, and the B-3 version cutoffs from 2017-18 forward. Exhibit A2 below depicts kindergarten readiness probabilities over time using this approach (Panel A), compared to the approach of applying the B-K version cutoffs in all years (Panel B).

[60] Lambert, R. (2017). *Technical Manual for the Teaching Strategies GOLD™ Assessment System: Birth through third grade edition*.
[61] Lambert, R., Kim, D., & Burts, D. (2014). Technical manual (3rd edition) for the *Teaching Strategies GOLD* Assessment System.
[62] K. Houser, Teaching Strategies (personal communication, November 16, 2020).

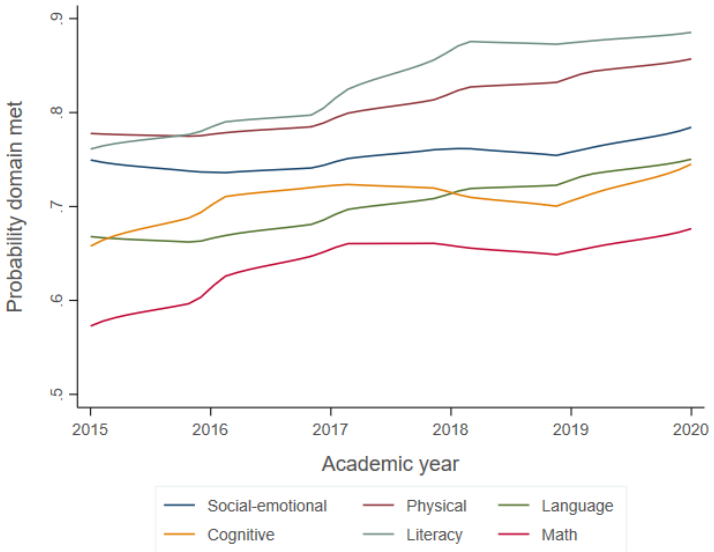
Exhibit A2

Average probability of Kindergarten Readiness Over Time, Comparing WaKIDS Raw Score Domain Cutoff Versions

(A) B-3 K-Ready Cutoffs Applied Starting in 2017-18



(B) B-K K-Ready Cutoffs Applied in All Years



Notes:
Figures show the unadjusted probability of meeting/exceeding the kindergarten readiness benchmark score in each domain.

IV. Sample Construction and Attrition

In this section, we provide additional detail regarding study sample construction for sites and children in subsidized childcare. The sample composition and construction for this evaluation largely followed the previous report (EA report two).[63] However, in this report, we only study the sample of *non*-ECEAP licensed child care sites (and children attending those sites with subsidy).

The sample construction consisted of two major steps: foundational sample construction and analysis sample construction. The foundational sample has been used and will continue to be used, throughout the WSIPP Early Achievers evaluation report series The analysis samples apply site and child inclusion and exclusion criteria specific to the research questions addressed in this report.

Foundational Sample

We first integrated site-level Early Achievers records from multiple source systems and reports over time to construct a site by academic year (AY) crosswalk file. This crosswalk currently includes sites that were present in Early Achievers administrative records from the 2012-13 AY through the 2018-19 AY. The crosswalk allows us to connect site-level data sets across years and different site identifiers (i.e., provider ID/Merit ID/ FamLink ID).

To create the site-by-year panel we merge site-level data sources using the crosswalk file. Site-level data sources for Early Achievers participation and ratings include monthly MERIT demographic, registration, and evaluation request reports; Early Achievers Monitoring Reports; and web-based Early Learning System (WELS) Early Achievers rating records. Additionally, to observe site characteristics not included in Early Achievers records; we incorporated licensing data. For non-ECEAP licensed child care, sources included FamLink monthly reports and WA Compass records. Importantly, this site-level panel provides information about Early Achievers participation, milestone completion dates, and rating levels.

Second, we used child care enrollment records to identify all children who participated in subsidized child care during our target years. Monthly payment records from the Social Service Payment System (SSPS) were used to define participation in subsidized child care for each AY.

Third, we linked child enrollment records to each site attended, for each month of attendance. Children can attend multiple child care sites and each site is observed, the resulting data are a child-by-site-by-month panel. We aggregate these data into a child-by-site-by-AY panel.[64] Imperfect historic record systems result in the loss of both sites and children in this step. Specifically, not all sites in the crosswalk have observed child enrollments, and not all children in enrollment records could be accurately matched to a site given the available site identifiers. Children in subsidized child care during our target years who were born before September 2008 or after August 2015 were not part of our defined study cohorts and were excluded in this step.

[63] Unlike EA report two, the study sample in this evaluation include children enrolled in pre-k child care in the 2018-2019 AY.
[64] If a child attends more than one site in a given AY, the child will have multiple observations corresponding to each site attended within the AY.

Analysis Samples

All additional steps in sample construction were taken to specify an analysis sample for the specific research questions addressed in the present report.

Starting with the foundational child-by-site-by-AY panel, we restricted our sample to children observed in both kindergarten enrollment (between the 2016-2020 AYs) *and* subsidy child care in the previous year (between the 2015-2019 AYs). Children may be enrolled in multiple child care sites in the pre-k year; therefore, to ensure we only have one observation per child, our sample keeps information from the first site the child attended in the pre-k year.[65] We retain the child's first enrolled site during the AY prior to their first kindergarten enrollment and refer to this as the child's *pre-k year enrollment*.[66] For this study, we restrict the sample to children enrolled in a site that has completed the EA rating process and has received a rating level. A child is in the treatment group if they attend a site in the pre-k year that is rated at a Level 3 or higher, and a child is in the control group if they attend a site rated at a Level 2.

We apply additional restrictions to arrive at the final analysis sample.

We omitted sites with the following characteristics:

- Missing or illogical EA milestone date records;
- No observed subsidy enrollments in SSPS records after 2015 or before 2018;
- Enrollments observed for less than two years in SSPS records;
- Sites with fewer than four children enrolled;[67]and
- Licensed sites that started an ECEAP contract in the same period as Early Achievers engagement. We consider starting an ECEAP contract to be a confounding "treatment" that would preclude attributing any potential effects to Early Achievers. Further, because eligibility criteria for ECEAP differ from those for child care subsidy, we were also concerned about changes in the composition of children attending these sites before and after an ECEAP contract, which would invalidate analysis of within-site change in child outcomes pre and post EA rating.[68]

[65] 21% of our sample attend more than one site in the pre-k year, all models control for the number of sites attended in the pre-k year. If the first site attended is simultaneous with another in the pre-k year, these children are dropped from the sample (about 3% of observations).

[66] In this step, we selected children observed in kindergarten enrollment records in our target years and in the year prior to their first kindergarten enrollment, without regard to year of "expected" kindergarten enrollment. Expected enrollment is based on birth cohort. About 72% of children observed in a pre-k setting at age four, were also observed in kindergarten. Kindergarten enrollment before or after the "expected" year was rare in our sample. For the subsidy sample, 0.5% of children appeared to be enrolled one year earlier than expected, and 2% appeared to be enrolled one year later than expected based on birth cohort.

[67] This is the minimum restriction needed to ensure that there are enough children in a given site to estimate standard errors that allow for clustering at the site level across all analyses and subsampling. Furthermore, this restriction and the one previously listed yield more precise and stable estimates.

[68] DCYF. Getting help paying for child care. *Child care subsidy programs.*

We excluded children with the following characteristics:

- Subsidy and ECEAP enrollment simultaneously in pre-k and
- Exposure to a rated site at any time *after* pre-k enrollment (including after starting kindergarten) but not *during* pre-k enrollment.[69]

Our final sample of children enrolled in a subsidy site with an observed EA rating in their pre-k year comprised 6,071 children in 519 sites.

[69] We apply this restriction because we are interested in the exposure of quality care on kindergarten outcomes *prior to* kindergarten enrollment.

V. Research Design and Results

To mitigate bias due to family selection into attending a site that has received a passing rating, we implement a statistical approach known as entropy balancing (weighting). Entropy balancing is a method that reweights the comparison observations such that the mean and variance of selected control variables are the same in the treatment and comparison groups.[70]

Entropy balancing is a data preprocessing method that achieves balance on a set of pre-determined user-specified covariates in an observational study with a binary treatment variable.[71] This method directly estimates weights (rather than the propensity score) that solve a constrained optimization problem such that the reweighted treatment and comparison group balance on covariates incorporating information about known sample moments (e.g., mean, variance, skewness) and minimizing entropy distance (i.e., "uncertainty").[72] In other words, entropy weights allow us to exactly adjust for inequalities in observable predictors across the two groups (with regards to not only the mean but also higher moments of the predictor variable distribution).

There are several proposed advantages of entropy weighting over alternative statistical data prepossessing methods (e.g., propensity score matching, exact matching, covariate balancing propensity score).[73] First, entropy balancing is more flexible than alternative data preprocessing methods that either match or discard observations—such as nearest neighbor or exact matching. Furthermore, in the case of exact matching, there is a trade-off between the number of matching covariates and the matched sample size (i.e., "the curse of dimensionality"). Entropy weighting reweights observations such that the maximum number of observations are preserved, even for large sets of covariates, without compromising balance—i.e., external validity is preserved without compromising internal validity. These benefits are particularly pronounced in the case of small sample size, with several low-probability covariates, and relatively unequal sample sizes across treatment and comparison groups—such as with our study.

Second, most methods (even those that similarly reweight observations on a continuum) do not directly focus on achieving balance on predictor variables. In practice, researchers often manually iterate across different matching covariates and propensity score models until a satisfactory balance is achieved. Furthermore, matching can offset reductions in bias when adjustments to propensity scores improve balance for some covariates while worsening balance for others.

The child-level and school-level characteristics that are weighted using this method are summarized in Exhibits A3 and A4, respectively.

[70] We perform entropy balancing using Stata's user-written program "ebalance" (Hainmueller & Xu (2013) and applying the default tolerance level of 0.015.
[71] In our study, the primary treatment indicator is "attending a site rated at quality."
[72] Hainmueller, J. (2012). Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political analysis*, 25-46.
[73] MacDonald, J.M., & Donnelly, E.A. (2019). Evaluating the role of race in sentencing: An entropy weighting analysis. *Justice Quarterly*, *36*(4), 656-681.

Exhibit A3

Child Characteristics (2015-2019)

	At quality	Not at quality
Female	0.498 (0.500)	0.517 (0.50)
Race:		
Black	0.085 (0.28)	0.155 (0.362)
Hispanic	0.271 (0.444)	0.258 (0.438)
White	0.463 (0.499)	0.380 (0.486)
Other	0.180 (0.384)	0.206 (0.405)
Primary language:		
English	0.905 (0.294)	0.894 (0.309)
Spanish	0.073 (0.261)	0.087 (0.282)
Other	0.022 0.147	0.020 (0.139)
Sites attended before kindergarten:		
1	0.392 (0.488)	0.344 (0.475)
2	0.275 (0.447)	0.253 (0.435)
3+	0.333 (0.471)	0.403 (0.491)
Attends multiple sites the pre-k year	0.208 (0.406)	0.284 (0.451)
In pre-k year care for full year	0.508 (0.500)	0.506 (0.500)
Moved to current site	0.551 (0.0.494)	0.580 (0.487)
In care while in kindergarten	0.284 (0.451)	0.415 (0.493)
Observations	5,453	921

Notes:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.
Child information comes from subsidy site enrollment in the pre-k year from the AYs 2015-2019.

Exhibit A3 (cont):
Child Characteristics (2015-2019)

	At quality	Not at quality
Age at kindergarten enrollment	5.475 (0.303)	5.459 (0.302)
Has CPS contact	0.357 (0.479)	0.342 (0.475)
Parents marital status at birth	0.261 (0.439)	0.232 (0.423)
Less than high school	0.218 (0.413)	0.260 (0.439)
High school complete	0.368 (0.482)	0.370 (0.483)
More than high school	0.414 (0.493)	0.370 (0.483)
Mother's age	24.961 (5.382)	24.643 (5.372)
First born child	0.333 (0.471)	0.332 (0.471)
Premature	0.083 (0.276)	0.085 (0.279)
Observations	5,453	921

Notes:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.
Child information comes from subsidy site enrollments in the pre-k year from the AYs 2015-2019.

Exhibit A4

Kindergarten School Characteristics (2016-2020)

	At quality	Not at quality
Proportion enrolled, K-3rd grade	0.646 (0.106)	0.639 (0.097)
Proportion enrolled, low income	0.600 (0.206)	0.604 (0.216)
Proportion enrolled, Hispanic	0.267 (0.198)	0.264 (0.147)
Percent enrolled, White	0.495 (0.224)	0.421 0.217
Proportion enrolled, disabled	0.164 (0.047)	0.156 (0.048)
Observations	5,453	921

Notes:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.
School information comes enrollment in the AYs 2016-2020.

Our entropy balanced estimation approach does not directly address potential bias due to site-level selection into treatment—the primary concern is that sites with higher quality programming before QRIS participation are more likely to rate "at quality" and more likely to produce greater kindergarten readiness regardless of EA rating (and coaching receipt).[74] Therefore all models additionally control for the following site-level covariates: average monthly enrollment, years-in-operation, an indicator for any coaching services uptake, an indicator for initial rating, and region. Furthermore, we control for the following site-level census tract characteristics: population size and demographics, education level, economic conditions, poverty, housing, and language. Respectively, Exhibits A5 and A6 summarize these covariates.

Last, all models include year fixed effects to account for annual shocks shared across all sites (e.g., economic recession) and all model control for how many years the school enrolled (in kindergarten) has implemented WaKIDS.

We estimate logistic regression models that estimate standard errors that allow for clustering at the site level.

[74] Although there exist statistical methods that allow for matching at both the site-level and child-within-site-level, we do not have sufficient statistical power or variation in rating (level) status to confidently estimate reliable results using these techniques.

Exhibit A5

Child Care Site Characteristics (2015-2019)

	At quality	Not at quality
Average monthly enrollment	50.404 (30.344)	67.431 (37.92)
Years-in-operation	8.611 (2.224)	8.999 (1.997)
Site has received coaching	0.788 (0.409)	0.866 (0.340)
Initial rating	0.725 (0.447)	0.808 (0.394)
Region:		
Central	0.092 (0.289)	0.003 (0.057)
Eastern	0.184 (0.388)	0.055 (0.229)
King & Pierce	0.360 (0.480)	0.554 (0.497)
Northwest	0.144 (0.317)	0.225 (0.418)
Olympic Peninsula	0.121 (0.326)	0.054 (0.227)
Southwest	0.129 (0.336)	0.109 (0.311)
Observations	5,453	921

Notes:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.
Site information comes from subsidy site enrollments in the pre-k year from the AYs 2015-2019.

Exhibit A6

Census Tract Characteristics (2015-2019)

	At quality	Not at quality
Total population	5,504.86 (1,941.347)	5,121.182 (1,567.457)
Population rate, under 5	0.068 (0.023)	0.065 (0.024)
Population rate, White	0.738 (0.165)	0.675 (0.176)
Population rate, BIPOC*	0.353 (0.196)	0.391 (0.193)
Education:		
Population rate, more than bachelor's degree	959.999 (711.251)	891.172 (604.397)
Population rate, less than bachelor's degree	0.733 (0.131)	0.733 (0.118)
Unemployment rate	6.755 (3.458)	5.684 (2.904)
Log household median income	10.890 (0.375)	10.966 (0.319)
Rate of households renting	0.467 (0.192)	0.445 (0.203)
Rat of households with English as a second language	0.056 (0.051)	0.048 (0.059)
Rate of household's w/income below 80% of median	0.350 (0.045)	0.346 (0.041)
Observations	5,453	921

Notes:

* Black, Indigenous, and people of color (BIPOC).

ACS 5-year Census Tract characteristics information from the years 2015-2019.

Manson, S., Schroeder, J., Van Riper, D., Kugler, T., & Ruggles, S. (2021). *IPUMS National Historical Geographic Information System: Version 16.0 [dataset].* Minneapolis, MN: IPUMS.

Research Question 1: Duration of Quality-Level Care

In WSIPP's Early Achievers report two, we find that children who attend a site with a rating level that is "at quality" in the year before kindergarten are 3.5 percentage points more likely to meet/exceed expectations for all six WaKIDS domains than children who attend a site that did not receive a rating level "at quality"—this result is statistically significant at the 0.10 level.

We expand our previous model to allow for the following two comparisons to be made:

3) One year of "at quality" care vs. no "at quality" care
4) Two years or more of "at quality" care vs. no "at quality" care

In this section, when we refer to "years of care" we mean years prior to *and* including the pre-k year. Furthermore, "years of care" need not be continuous and uninterrupted (e.g., a child in quality care in the years 2015 and 2017 would be categorized as exposed to quality care for two years, where 2017 is the year right before kindergarten attendance).[75]

Note, 3.2% of children in our sample experienced quality care before the pre-k year but not in the pre-k year; these children were dropped from the analyses in this section. Therefore, children in the "0" group (i.e., the comparison group) are children who were never exposed to quality ECE programming in our sample.

Exhibit A7 summarizes relevant characteristics regarding child care history across different "at quality" exposure categories—zero years, one year, and two-plus years.[76]

In particular, we estimate the following model on the entropy balanced sample of children in a rated subsidy site in their pre-k year

$$K\text{-}Readiness_{is(y+1)} = \beta_0 + \beta_1 (One\ year\ at\text{-}quality_{isy}) + \beta_2 (Two\text{-}plus\ years\ at\text{-}quality_{isy}) + \delta_1 X_i + \delta_2 Z_{sy} + \lambda_y + \epsilon_{isy}$$

Where our outcome of interest is kindergarten readiness measured in the kindergarten year (i.e., y+1). Our coefficients of interest are β_1 and β_2. X_i represents the aforementioned child and school covariates, and Z_{sy} represents the aforementioned site and census tract covariates. λ_y represents year fixed effects.

[75] A child is categorized as receiving "one year of care" if they have attended 1-17 months of care, and they are categorized as receiving "two-plus years of care" if they have received more than 17 months of care. Our key results are qualitatively robust to alternative definitions of one and two years. In analyses not presented here, we also look at the relationship between "months of at-quality care" and kindergarten readiness; we find that on average one more one of care has not significant impact on WaKIDS domain readiness.

[76] All models control for "months of subsidy care, ever" (regardless of quality). We do this to ensure we estimate the impact of duration of *quality care* on kindergarten-readiness distinctly from the impact of duration of any care.

Exhibit A7

Child Care Enrollment History

	Duration of "at quality" care		
	0 years	1 Year	2+ Years
Months of subsidy care, pre-k year	6.71 (4.1)	6.39 (3.91)	9.78 (3.37)
Months of subsidy care, ever	32.41 (17.71)	26.79 (17.4)	42.47 (14.6)
Months of care at quality, pre-k year	NA	6.17 (3.86)	9.74 (3.40)
Months of care at quality, ever	NA	8.52 (4.73)	28.02 (8.87)
Consecutive months of care in pre-k year	0.95 (0.22)	0.94 (0.23)	0.95 (0.22)
Consecutive annual care	0.89 (0.31)	0.87 (0.34)	0.95 (0.23)
Age of attendance, first subsidy site	2.22 (1.55)	2.61 (1.65)	1.68 (1.16)
Age of attendance, first site at quality	NA	4.23 (0.76)	2.68 (0.94)
Number of sites attended pre-k year	1.35 (0.66)	1.26 (0.56)	1.24 (0.52)
Number of sites attended, ever	2.48 (1.70)	2.33 (1.57)	2.43 (1.53)
Observations	798	3,501	1,955

Notes:
Information from children enrolled in subsidy care in the pre-k year between 2015-2019 (historical enrollment information goes back to 2010).

The results of our primary analyses are depicted in Exhibit A8. Column 1 depicts results from an analysis looking at the outcome "demonstrated proficiency on least 5 out of 6 WaKIDS domains," and Column 2 depicts results from an analysis looking at the outcome "demonstrated proficiency on all 6 WaKIDS domains." Panel A depicts differences in kindergarten readiness when comparing children enrolled in "at quality" childcare in the pre-k year to children not enrolled in care receiving an "at quality" rating level the pre-k year (the baseline results estimated in WSIPP's Early Achievers report two). Panel B depicts our estimates from the above equation explaining differences in kindergarten readiness between children exposed to varying levels of "at quality" care and children who are exposed to no care rated "at quality."

We find that the positive relationship between attending a site rated "at quality" in the pre-k year and kindergarten readiness (Panel A) is driven by children who have attended a site rated "at quality" for two or more years, including the pre-k year (Panel B).

Note, we cannot fully rule out the possibility that the estimated differences in program efficacy across these categories—0 years, 1 year, 2-plus years—are driven by relevant unobservable family/child characteristics. For example, it could be the case that children in families with greater stability, resources, or connections are both more likely to be in care for two years (versus one year or zero years), and more likely to achieve kindergarten readiness regardless of exposure to high-quality child care.

Exhibit A8

Years of Attending an "At Quality" Site and Kindergarten Readiness—Main Results

	WaKIDS domains proficient	
	At least 5 of 6 (1)	All 6 (2)
Panel A: Baseline		
Rated at quality	0.033* (0.020)	0.035* (0.020)
Panel B: Years of exposure		
1 year	-0.009 (0.022)	0.002 (0.023)
2+ years	0.052** (0.026)	0.052* (0.029)
Observations	6,168	6,168
Outcome mean	0.554	0.362
Outcome standard deviation	0.497	0.481

Notes:
Each panel and each column represent a separate entropy balanced weighted regression.
Marginal effects are reported.
Each model controls for the full set of control variables and adjusts standard errors for clustering at the site level.
***Significant at the 0.001-level, **significant at the 0.05-level, and *significant at the 0.10-level.

To further understand the relationship between duration in child care that is rated "at quality" and kindergarten readiness, we examine alternative comparisons. The results from these analyses are depicted in Exhibit A9.

1) Examine how our previous results differ when we separately examine "2 years of at quality care" and "3+ years at quality" care (Panel A).
2) Compare children with one year of pre-k "at quality" care to "2 years of at quality care" and "3+ years of at quality care" (Panel B).
3) Compare children with "2 years of at quality care" to children with "3+ years of at quality care" (Panel C).

Results in panels A and B of Exhibit A9 further support that the findings of EA report two are driven by more than one year of exposure to care in a site rated "at quality." The results in Panel C indicate that the impact of 3+ years of "at quality" care on kindergarten readiness is indistinguishable from the impact of two years of "at quality" care. In our sample, the number of children in care for 3+ years is relatively small, and therefore estimates for this category are imprecise. Further examination of the relative effectiveness of 3+ years of quality care versus two years of quality care is required.

Exhibit A9

Years of Attending an "At Quality" Site and Kindergarten Readiness—Alternative Comparisons

	WaKids domains proficient	
	At least 5 of 6 (1)	All 6 (2)
Panel A: Compared to not "at quality"		
1 year	-0.009 (0.022)	0.002 (0.023)
2 years	0.043* (0.026)	0.058** (0.028)
3+ years	0.074** (0.035)	0.038 (0.038)
Observations	6,168	6,168
Outcome mean	0.554	0.362
Outcome standard deviation	0.497	0.481
Panel B: Compared to 1 year of "at quality"		
2 years	0.043* (0.025)	0.072*** (0.024)
3+ years	0.107*** (0.038)	0.063* (0.033)
Observations	5,276	5,276
Outcome mean	0.564	0.378
Outcome standard deviation	0.496	0.485
Panel C: Compared to 2 years of "at quality"		
3+ years	0.033 (0.032)	-0.014 (0.036)
Observations	1,772	1,762
Outcome mean	0.583	0.392
Outcome standard deviation	0.493	0.488

Notes:
Each panel and each column represent a separate entropy balanced weighted regression.
Marginal effects are reported. Each model controls for the full set of control variables and adjusts standard errors for clustering at the site level.
***Significant at the 0.001-level, **significant at the 0.05-level, and *significant at the 0.10-level.

Research Question 2: Neighborhood Vulnerability

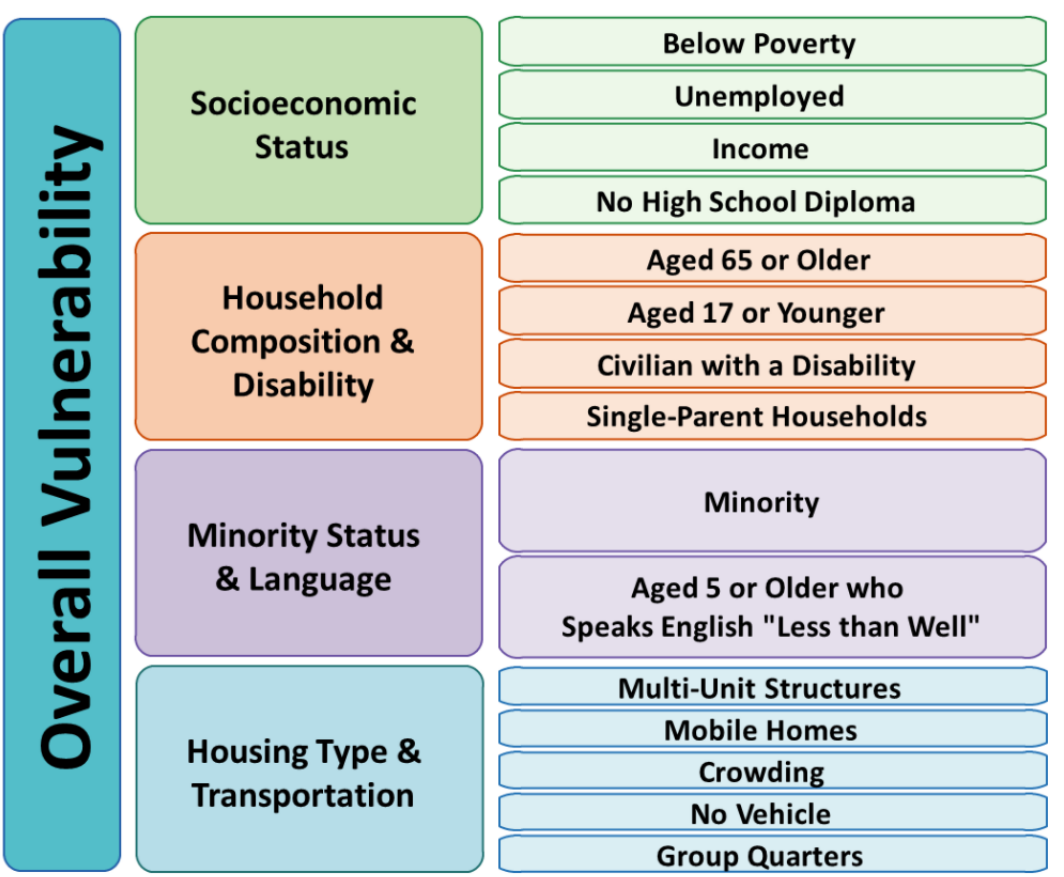
This analysis explores the impact of the interaction of neighborhood vulnerability on the positive relationship between quality care and kindergarten readiness. For this study, we define "neighborhoods" as census tracts and "neighborhood vulnerability" is quantified using the CDC's Social Vulnerability Index (SVI) database.[77] This database was created using the Agency for Toxic Substances and Disease Registry's (ATSDR's) Geospatial Research, Analysis, and Services Program (GRASP) with the intent to provide information to emergency response planners and public health officials about what communities would be most at risk in the event of a hazardous event (i.e., a natural weather disaster, a disease outbreak, or chemical/oil spill). The SVI ranks the overall vulnerability of all the census tracts in the United States on a scale of zero to one based on 15 social factors, with zero being the lowest level of vulnerability and one being the highest.

The overall SVI is composed of four subcategories or themes (as defined by the CDC): socioeconomic status; household composition and disability; race, ethnicity, and language; and housing and transportation. The characteristics that comprise these categories are depicted in Exhibit A9. All the data that composes the SVI comes from the American Community Survey (ACS), 2014-2018 (5-year) data. [78]

[77] Centers for Disease Control and Prevention/ Agency for Toxic Substances and Disease Registry/ Geospatial Research, Analysis, and Services Program. CDC/ATSDR Social Vulnerability Index 2018 and 2016 Database WA.
[78] CDC SVI Documentation 2018 | Place and Health | ATSDR.

Exhibit A9

Social Vulnerability (SVI) Composition



Note:
CDC SVI Documentation 2018 |Place and Health |ATSDR.

The sample used for these analyses is restricted to children in pre-k care in the years 2016 and 2018. The sample was restricted to these years because they are the only years that the SVI data was available during or study period.

The SVI is a continuous percentile ranking, but for our study, the primary comparison will be sites ranked in the 75th percentile SVI versus sites ranked below the 75th percentile SVI; about 45% of our sample attend a site located in the 75th percentile SVI. We classify those sites in the 75th percentile SVI as "higher-vulnerability" sites and those ranked below the 75th percentile as "lower-vulnerability." Additionally, we repeat the same comparison with the 90th percentile ranking; about 15% of our sample is located in the 90th percentile.

Exhibit A10

Site Characteristics by SVI Ranking

	Lower vulnerability	Higher vulnerability
Proportion rated "at quality"	0.88 (0.33)	0.91 (0.29)
Average monthly enrollment	35.35 (26.37)	45.49 (28.51)
Percent subsidy enrollment	40.48 (23.47)	54.51 (25.91)
Years in operation	8.61 (2.11)	8.77 (1.81)
Proportion ever received coaching service	0.81 (0.39)	0.79 (0.41)
Proportion on initial rating	0.76 (0.37)	0.85 (0.29)
Enrollment proportions, by race:		
Black	0.10 (0.20)	0.11 (0.20)
Hispanic	0.24 (0.25)	0.30 (0.28)
White	0.48 (0.32)	0.40 (0.31)
Other	0.18 (0.24)	0.19 (0.22)
Average number of months children enrolled in a site prior to kindergarten	20.96 (10.10)	22.42 (10.18)
Census tract total population under 5 years old	349.48 (178.55)	404.58 (217.68)
Observations	184	144

Notes:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.
Site information comes from subsidy site enrollments in the pre-k year from the years 2016 and 2018.

To examine how the relationship between "at quality" subsidy child care and kindergarten readiness differ across neighborhood vulnerability, we estimate the following model:

$$K\text{-}Readiness_{is(y+1)} = \beta_0 + \beta_1(At\text{-}quality_{isy}) + \beta_2(Higher\text{-}vulnerability_{isy}) + \beta_3(At\text{-}quality_{isy} X\ Higher\text{-}vulnerability_{isy}) + \delta_1 X_i + \delta_2 Z_{sy} + \lambda_y + \epsilon_{isy}$$

Where $K\text{-}Readiness_{is(y+1)}$, X_i, Z_{sy}, and λ_y are defined as before.[79] $Quality_{isy}$ indicates a child attends a site rated at quality in the pre-k year, and $Higher\ Vulnerability_{isy}$ indicates a child attends a site located in a higher-vulnerability census tract. ($At\text{-}Quality_{isy}\ X\ Higher\ Vulnerability_{isy}$) is the interaction term; therefore, β_3 captures the difference in the relationship between attending a site rated at quality and kindergarten readiness for children attending a site in a higher-vulnerability neighborhood versus a lower-vulnerability neighborhood.

Results from these analyses are summarized in Exhibit A11. Panel A summarizes the relationship between quality ECE participation and kindergarten readiness using the subsample of data from the years 2016 and 2018. Panel B summarizes how this relationship differs for those attending sites in a neighborhood in the 75th percentile SVI (higher vulnerability). Results indicate that the positive relationship between attending a site rated "at quality" and kindergarten readiness is driven by children who attend sites located in the 75th percentile SVI. The results in this panel also indicate that attending a site rated "at quality" reverses the negative association between child care in high-vulnerability neighborhoods and kindergarten readiness. Panel C summarizes how this relationship differs for those attending sites located in the 90th percentile SVI.

[79] In these analyses we do not control for each individual census tract characteristic as this information is incorporated in the SVI measure, we still control for the aforementioned site characteristics (e.g., monthly enrollment).

Exhibit A11
"At Quality" Rating and Kindergarten Readiness,
Differences Across SVI Ranking

	WaKids domains proficient	
	At least 5 of 6 (1)	At least 6 of 6 (2)
Panel A: Baseline		
"At quality"	0.058* (0.033)	0.064** (0.031)
Panel B: 75th percentile SVI		
"At quality "	0.028 (0.038)	0.027 (0.040)
75th percentile SVI	-0.060 (0.048)	-0.093* (0.048)
"At quality" x 75th percentile SVI	0.066 (0.049)	0.102* (0.053)
Panel C: 90th percentile SVI		
"At quality"	0.034 (0.039)	0.078*** (0.026)
90th percentile SVI	-0.139** (0.060)	-0.008 (0.049)
"At quality" x 90th percentile SVI	0.148* (0.063)	0.050 (0.050)
Observations	2,225	2,225
Outcome mean	0.545	0.354
Outcome standard deviation	0.498	0.478

Notes:
Each panel and each column represent a separate entropy balanced weighted regression. Marginal effects are reported. Each model controls for the full set of control variables (except for tract characteristics) and adjusts standard errors for clustering at the site level.
***Significant at the 0.001-level, **significant at the 0.05-level, and *significant at the 0.10-level.

We explore how the relationship between "at quality" child care enrollments and kindergarten readiness differ across SVI percentile ranking for each individual component comprising the SVI. For these analyses, we will again define "high vulnerability" and "low vulnerability" across the 75th percentile SVI threshold.[80] The results from these analyses are reported in Exhibit A12.

[80] Percentile rankings are estimated separately for each component. To generate the overall ranking, they "summed the sums for each theme, ordered the tracts, and then calculated overall percentile rankings." They note that taking the sum of the sums for each theme is the same as summing individual variable rankings. CDC SVI Documentation 2018 | Place and Health | ATSDR.

Exhibit A12

"At Quality" Rating and Kindergarten Readiness, Differences Across SVI Ranking, by Subcategory

	WaKids domains proficient	
	At least 5 of 6 (1)	At least 6 of 6 (2)
Panel A: Theme 1-socioeconomic status		
Quality rating	0.039 (0.041)	0.038 (0.033)
75th percentile SVI (theme1)	-0.073 (0.053)	-0.122** (0.057)
Quality rating x 75th percentile SVI (theme1)	0.075 (0.061)	0.118* (0.062)
Panel B: Theme 2-household composition/disability		
Quality rating	0.045 (0.036)	0.039 (0.032)
SVI theme 2	-0.013 (0.063)	-0.114* (0.065)
Quality rating x SVI theme 2	0.042 (0.067)	0.144** (0.068)
Panel C: Theme 3-race/ethnicity/language		
Quality rating	0.031 (0.045)	0.029 (0.041)
SVI Theme 3	-0.061 (0.054)	-0.090* (0.085)
Quality rating x SVI theme 3	0.060 (0.058)	0.085 (0.055)
Panel D: Theme 4-housing type/transportation		
Quality rating	0.029 (0.039)	0.042 (0.038)
SVI theme 4	-0.059 (0.077)	-0.057 (0.046)
Quality rating x SVI theme 4	0.077 (0.061)	0.058 (0.054)
Observations	2,225	2,225
Outcome mean	0.545	0.354
Outcome standard deviation	0.498	0.478

Notes:
Each panel and each column represent a separate entropy balanced weighted regression.
Marginal effects are reported.
Each model controls for the full set of control variables (except for tract characteristics) and adjusts standard errors for clustering at the site level.
***Significant at the 0.001-level, **significant at the 0.05-level, and *significant at the 0.10-level.

Research Question 3: Coaching and Quality Ratings

In our sample, approximately 9% of licensed childcare sites that received an initial rating did not have any record of receiving coaching services prior to rating. Exhibits A13 and A14 summarize relevant site-level and neighborhood characteristics by coaching uptake.

Among sites that did receive any coaching services prior to the initial rating, we define "higher-intensity" sites as those that received a number of coaching hours greater than the sample median. We define "lower-intensity" sites as those that received a number of coaching hours at or below the sample median. Exhibits A15 and A16 summarize relevant site-level and neighborhood characteristics by coaching intensity.

Exhibit A13

Site Characteristics by Coaching Status

	No coaching services	Coaching services
Average monthly enrollment	32.39 (28.75)	17.50 (20.32)
Percent subsidy enrollment (monthly)	53.62 (29.52)	53.71 (29.76)
Child care center (vs. family home child care)	0.73 (0.44)	0.46 (0.50)
Years-in-operation	7.33 (2.57)	8.08 (2.54)
Primary language of instruction ever non-English	0.12 (0.33)	0.28 (0.45)
Region:		
Central	0.05 (0.22)	0.16 (0.37)
Eastern	0.08 (0.27)	0.11 (0.31)
King & Pierce	0.64 (0.48)	0.45 (0.50)
Northwest	0.06 (0.24)	0.12 (0.33)
Olympic Peninsula	0.08 (0.28)	0.10 (0.30)
Southwest	0.09 (0.29)	0.06 (0.23)
Proportion enrolled, by race/ethnicity:		
Black	0.19 (0.28)	0.14 (0.30)
Hispanic	0.27 (0.29)	0.35 (0.41)
White	0.33 (0.29)	0.34 (0.38)
Other	0.21 (0.25)	0.17 (0.28)
Average monthly duration of site attendance	20.53 (10.74)	23.39 (12.77)
Observations	132	1,285

Notes:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.
Site information comes from subsidy site enrollments in the pre-k year from the years 2015-2019.

Exhibit A14

Site Census Tract Characteristics (2018) by Coaching

	No coaching services	Coaching services
SVI ranking in bottom 25%	0.15 (0.36)	0.11 (0.31)
SVI ranking between bottom 25% and 50%	0.19 (0.40)	0.16 (0.37)
SVI ranking between 50% and top 25%	0.20 (0.41)	0.26 (0.44)
SVI ranking in top 25%	0.45 (0.50)	0.47 (0.50)
Total proportion unmet child care need	0.68 (0.31)	0.72 (0.27)
Proportion unmet child care need[81], ages 0-3	0.81 (0.19)	0.83 (0.16)
Proportion unmet child care need, ages 3-4	0.50 (0.49)	0.54 (0.44)
Observations	93	755

Notes:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.
Information about unmet child need was provided by DCYF.

[81] Proportion unmet child care need is calculated as one minus the number of child care slots available divided by the number of children "in-need" of child care at the census tract level. Tracts with counts lower than ten have been redacted.

Exhibit A15

Site Characteristics by Coaching Intensity

	Lower intensity (1)	Higher intensity (2)
Average monthly enrollment	12.62 (15.14)	22.38 (23.50)
Percent subsidy enrollment (monthly)	55.51 (30.41)	52.00 (29.04)
Child care center (vs. family home child care)	0.32 (0.47)	0.59 (0.49)
Years-in-operation	8.24 (2.35)	7.90 (2.71)
Primary language of instruction ever non-English	0.33 (0.47)	0.22 (0.42)
Region:		
Central	0.20 (0.40)	0.13 (0.33)
Eastern	0.04 (0.19)	0.18 (0.38)
King & Pierce	0.43 (0.50)	0.46 (0.50)
Northwest	0.14 (0.35)	0.10 (0.30)
Olympic Peninsula	0.12 (0.33)	0.08 (0.27)
Southwest	0.06 (0.24)	0.05 (0.22)
Proportion enrolled, by race/ethnicity:		
Black	0.16 (0.32)	0.13 (0.27)
Hispanic	0.36 (0.43)	0.35 (0.38)
White	0.32 (0.39)	0.35 (0.36)
Other	0.17 (0.30)	0.17 (0.26)
Observations	639	638

Note:
Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.

Exhibit A16

Site Census Tract Characteristics, By Coaching Intensity

	Lower intensity (1)	Higher intensity (2)
SVI ranking in bottom 25%	0.11 (0.31)	0.10 (0.30)
SVI ranking between bottom 25% and 50%	0.18 (0.38)	0.14 (0.35)
SVI ranking between 50% and top 25%	0.26 (0.44)	0.27 (0.44)
SVI ranking in top 25%	0.45 (0.50)	0.49 (0.50)
Total proportion unmet child care need	0.72 (0.24)	0.71 (0.29)
Proportion unmet child care need, ages 0-3	0.84 (0.14)	0.83 (0.17)
Proportion unmet child care need, ages 3-4	0.54 (0.39)	0.54 (0.48)
Observations	360	389

Notes:

Each column reports the unweighted sample mean with the corresponding standard deviation in parentheses underneath.

Information about unmet child need was provided by DCYF.

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